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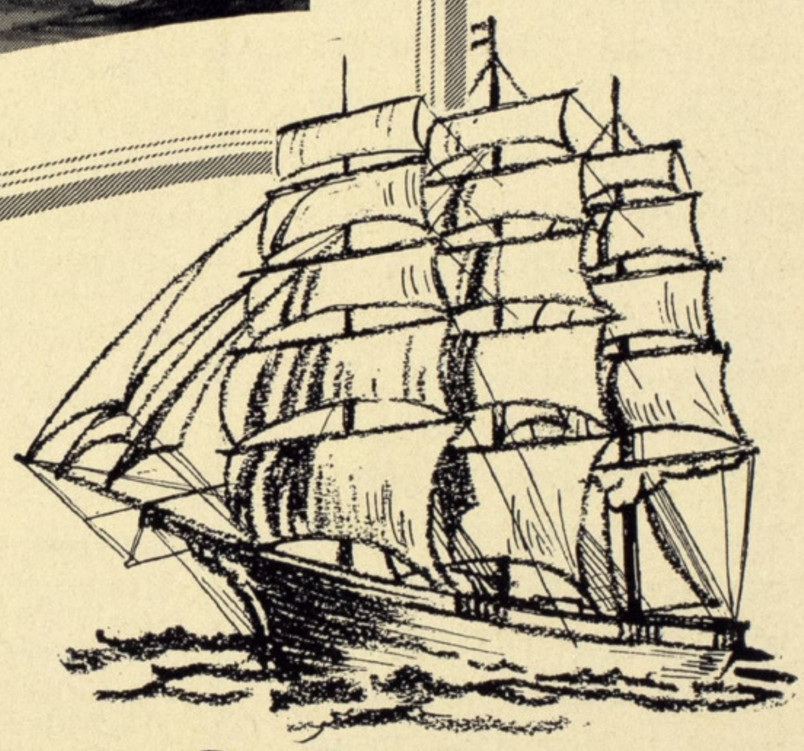

Marine Progress

shown by

DISTINCTIVE SHIPS

&

Yards Deliver Large American Liners

Merchant Shipbuilding in 1931

By A. H. Jansson

Editor, Marine Review

IN THESE pages, and for the ninth consecutive year, an attempt has been made to present an accurate informative record of steel shipbuilding, merchant type powered vessels of 100 feet in length and over and above 100 gross tons, in the United States during the calendar year 1931. The same plan in presenting these records has been followed from year to year. Insofar as possible a complete list is given of vessels in this category that were completed or under construction in any stage during the preceding calendar year. For the year 1931, 94 vessels are so listed on pages 44 and 45. From the list of vessels completed during this period the more outstanding and distinctive have been selected for detailed description, one to a page, illustrated with photograph and line plan.

The 17 selected ships featured in the following pages, through sister ships, cover 32 of the 94 units listed on pages 44 and 45. The information given for each selected ship, within the space limitations, has not only been carefully chosen for its value in characterizing the vessel to the shipowner, naval architect and marine engineer, but a special effort has been made to insure the greatest possible degree of accuracy. This gallery of ships therefore represents a striking cross section of American shipbuilding. In the nine years in which a similar presentation has been made in MARINE REVIEW, no less than 221 steel merchant type vessels from river craft to ocean liners have been described and illustrated in this uniform manner.

From year to year in this way it has also been possible to study by actual count the type and power of propelling machinery, the actual use of the internal combustion engine, the decline of coal and the increase of oil as fuel. Since 1925 each year an analysis compared with the year before has been given covering these and other points. For instance, in the calendar year 1924 there were 101 vessels listed as completed or under construction in that period. Of that number 69 or 68.3 per cent were using steam as primary power and 32 or 31.7 per cent were fitted with diesel as primary power. For the calendar year 1931, 94 vessels are listed (pages 44, 45), with steam as primary power in 58 or 61.7 per cent

Motive Power Compared--Two Years

Types	Number 1931	Number 1930	Per Cent 1931	Per Cent 1930
Steam reciprocating coal burner	6	20	6.4	15.4
Steam reciprocating oil burner	16	16	17.0	12.3
Steam turbine oil burner	26	15	27.7	11.5
Diesel engine direct drive	31	40	33.0	30.8
Diesel engine electric drive	5	20	5.3	15.4
Turbine electric oil burner	10	18	10.6	13.9
Turbine electric coal burner	0	1	0.0	0.7
Totals	**94**	**130**	**100.0**	**100.0**

Recapitulating for Primary Power

Types	Number 1931	Number 1930	Per Cent 1931	Per Cent 1930
Steam—As primary power	58	70	61.7	53.8
Diesel—As primary power	36	60	38.3	46.2
Totals	**94**	**130**	**100.0**	**100.0**

Recapitulating for Power at Propeller

Types	Number 1931	Number 1930	Per Cent 1931	Per Cent 1930
Steam—Direct and gears	48	51	51.1	39.2
Diesel—Direct drive	31	40	33.0	30.8
Electric—Steam and diesel	15	39	15.9	30.0
Totals	**94**	**130**	**100.0**	**100.0**

Recapitulating for Fuel

Types	Number 1931	Number 1930	Per Cent 1931	Per Cent 1930
Steam—Burning coal	6	21	6.4	16.1
Steam—Burning fuel oil	52	49	55.3	37.7
Diesel—Diesel oil as fuel	36	60	38.3	46.2
Totals	**94**	**130**	**100.0**	**100.0**

Analysis of Power and Gross Tonnage of Vessels Listed on Pages 44-45

Type of Power	Number of Vessels	Total Gross Tons	Total Horsepower	Average Gross Tons	Average Horsepower
Turbine Electric	10	88,235	122,440	8824	12244
Turbine Gears	26	246,539	277,155	9482	10660
Reciprocating	22	19,035	24,800	865	1127
Diesel Electric	5	1,848	2,425	370	485
Diesel Direct	31	48,567	39,490	1567	1274
Totals	**94**	**404,224**	**466,310**	**4300**	**4961**

and diesel as primary power in 36 or 38.3 per cent, a definite gain over the earlier year.

A much more striking difference, however, is registered in the tendency away from coal as fuel. For the year 1924, 31 units representing 30.7 per cent used coal as fuel, whereas during the year 1931 only 6 vessels were listed as burning coal representing 6.4 per cent. All others were either steam, burning fuel oil under boilers or diesel. The reciprocating steam engine, it is evident from these definite figures, has had a serious decline. Of the 101 vessels listed in 1924, no less than 58 were fitted with steam reciprocating machinery or 57.4 per cent of the total. For the year 1931 out of 94 vessels listed, only 22 were fitted with steam reciprocating machinery or 23.4 per cent of the total. This is a proof of the gradual passing of coal as fuel and of the reciprocating steam engine as power.

Coming now to current conditions it is interesting to note the increase in steam turbine geared drive. Of the 94 vessels listed no less than 26 are fitted with this type of machinery, representing 27.7 per cent of the total number. A further analysis in one of the other tables shows that the total gross tonnage of these 26 vessels amounted to 246,539 tons or 60.9 per cent of the total gross tonnage. The total horsepower in turbine geared drives is 277,155 or 59.4 per cent of the total horsepower in all the 94 vessels. The average gross tonnage of the 10 vessels fitted with turbine electric drive is 8824 and the average horsepower is 12,244. In this case the average gross tonnage per vessel is somewhat less than for the turbine geared drive, but the average horsepower per vessel is greater by about 16 per cent.

ANALYSIS OF AMERICAN MERCHANT SHIPBUILDING—1931
COMPILED BY MARINE REVIEW

TYPES OF VESSELS	NUMBER	RECIP. COAL	RECIP. OIL	TURBINE OIL	DIESEL OIL	DIES. ELEC. OIL	TUR. ELEC. OIL
PASSENGER—OCEAN	26			18			8
FREIGHTER—COAST	5			2	3		
TANKER—OCEAN	5			1	4		
TANKER—COAST, BAYS	7				5	2	
FERRY—BAYS, RIVERS	6	1	3		1	1	
CARFERRY—OCEAN	2			2			
CARFERRY—LAKES	1	1					
TOWBOAT—HARBORS	5	1	2		2		
TOWBOAT—LAKES	2	1		1			
TOWBOAT—RIVERS	4	2	1		1		
FISHING—OCEAN	2				2		
FIREBOAT—HARBORS	2		1		1		
DREDGE—BAYS, RIVERS	12		7	1	4		
SPECIAL—OCEAN	13		1	1	8	1	2
SPECIAL—BAYS,RIVERS	2		1			1	
TOTALS	94	6	16	26	31	5	10

Diesel direct drive was somewhat greater in percentage of units than for the year 1930, but diesel electric drive in percentage of units, dropped from 15.4 per cent for 1930 to 5.3 per cent in 1931. The average size of diesel direct units showed a marked falling off for the year 1931 as compared with the year 1930; the average gross tonnage for the year 1931 being 1567 as compared with 3027 for the year 1930. The drop in average horsepower for the diesel direct unit was however much smaller, being 1274 for the year 1931 and 1358 for the year 1930. Some decline was shown in the average gross tonnage of units fitted with diesel electric drive, the average gross tonnage for 1931 being 370 and for 1930 being 512. The average horsepower for this type of drive showed little decline, being 485 for 1931 and 508 for 1930.

Distinctive Ships---Where to Find Them

Passenger Ships

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Mariposa, Ocean, Passenger, Freight	15
President Coolidge, Ocean, Passenger, Freight	17
President Hoover, Ocean, Passenger, Freight	14
Talamanca, Ocean, Passenger, Freight	16

Freighters

Edgewater, Cargo, Canal, Great Lakes	20

Ferries

Knickerbocker, Passengers and Vehicles	18
San Diego, Passengers and Vehicles	21

Tankers

Name and Service	*Page*
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White Flash, Coastwise, Bays	26

Towboats

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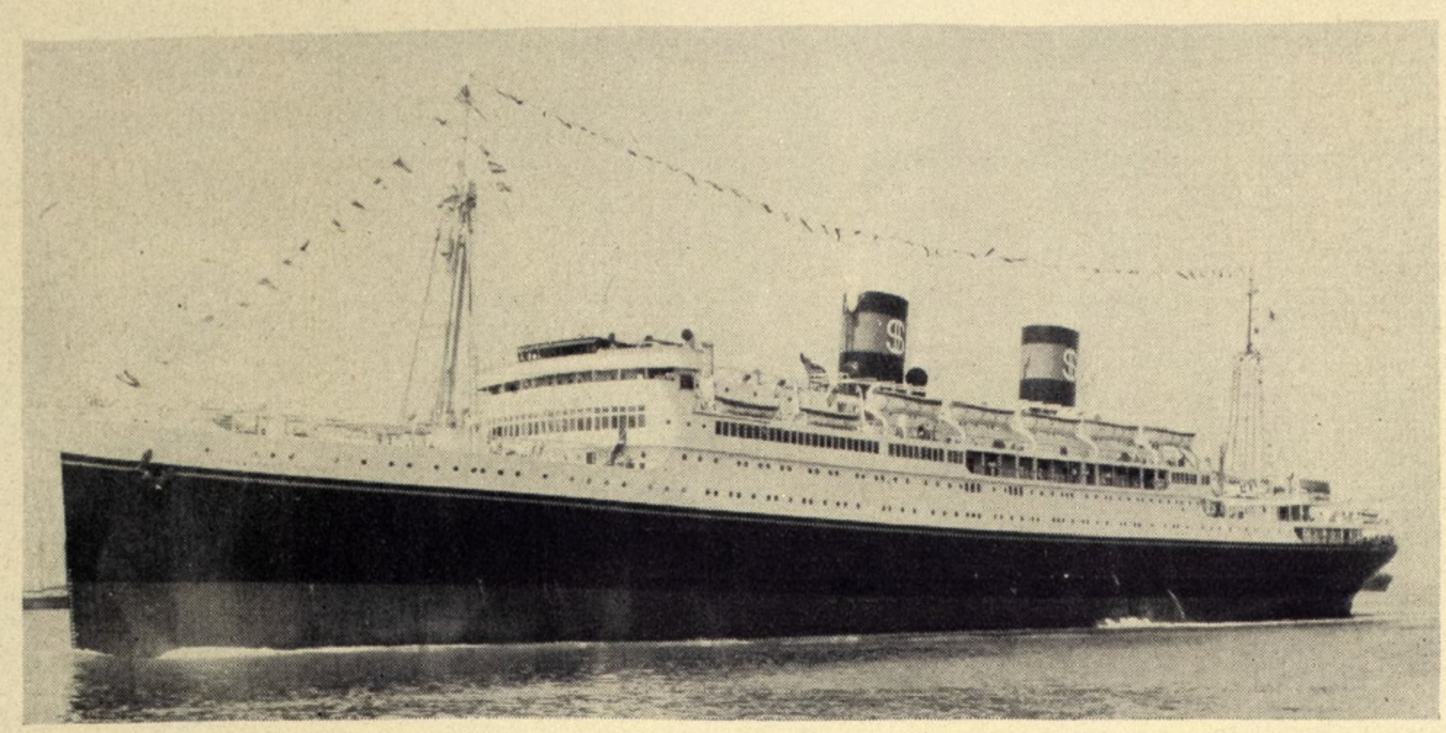
See Pages 44-45, for Complete Shipyard Record

PRESIDENT HOOVER—Passenger—Ocean—Twin Screw—Electric



Name—President Hoover
Owner—Dollar Steamship Lines Inc., Ltd.
Builder—Newport News S. B. & D. D. Co.
Naval Architect—Newport News S. B. & D. D.
Launched—Dec. 9, '30; comp. July 11, '31
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 654 feet, 3 inches; length between perpendiculars, 615 feet; breadth molded, 81 feet; depth molded to shelter deck at side, 52 feet; draft loaded, 32 feet; displacement loaded, 31,441 tons; gross tonnage, 21,936; net tonnage, 12,986; passenger capacity, first class 307; special class, 133; third class, 170; steerage, 378; cargo capacity, 8000 tons, and in cubic feet, non-refrigerated, 549,400, refrigerated, 59,450; bunker fuel oil capacity in tons, 6244; speed at sea, 20 knots.

MACHINERY PARTICULARS

Main Engines—Two, General Electric turbine generating units and two electric motors direct connected to propellers. Total horsepower 26,500 at 133 revolutions per minute. Machinery and vessel fully described in Marine Review for August, 1931. The generators are alternating current and are each of 10,100 kilowatts capacity.

Boilers—Twelve, Babcock & Wilcox watertube marine boilers with a total heating surface of 57,624 square feet and total superheating surface of 5700 square feet; working pressure, 300 pounds; 200 degrees Fahr. superheat; fuel, oil. Superheaters, de-superheaters, feed water regulators, oil-burning equipment and firebrick, all supplied by Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty Corp.

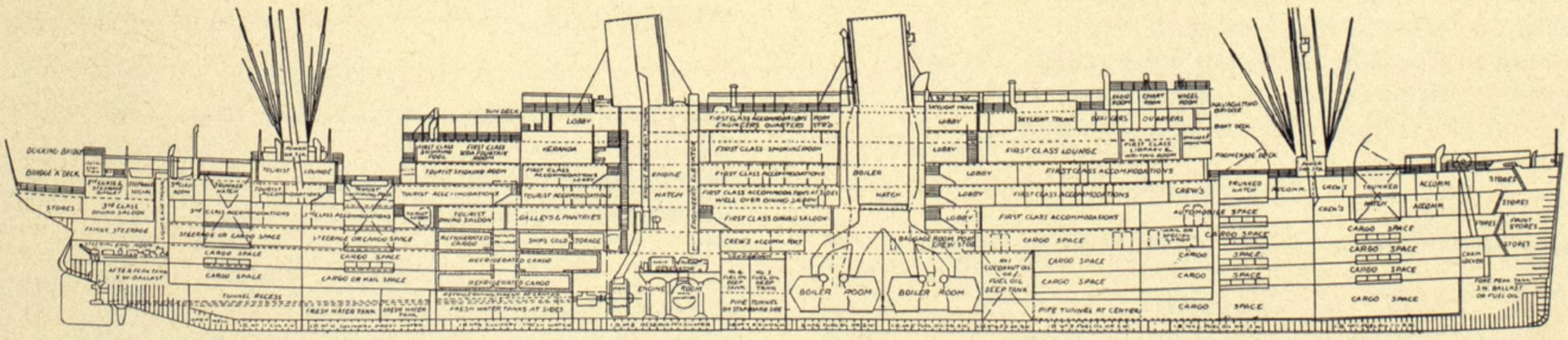
DESCRIPTION

Of complete superstructure type with bulbous bow and semi-cruiser stern, driven by twin screws, turbine electric machinery. Thoroughly modern from luxurious passenger accommodations to the smallest mechanical detail. Protected against the hazards of the sea by subdivision, stability, fire and navigation safeguards. For complete description see article in August, 1931, Marine Review.

Auxiliary Generators—Four, turbine geared, each 500 kilowatts, General Electric.

AUXILIARY EQUIPMENT

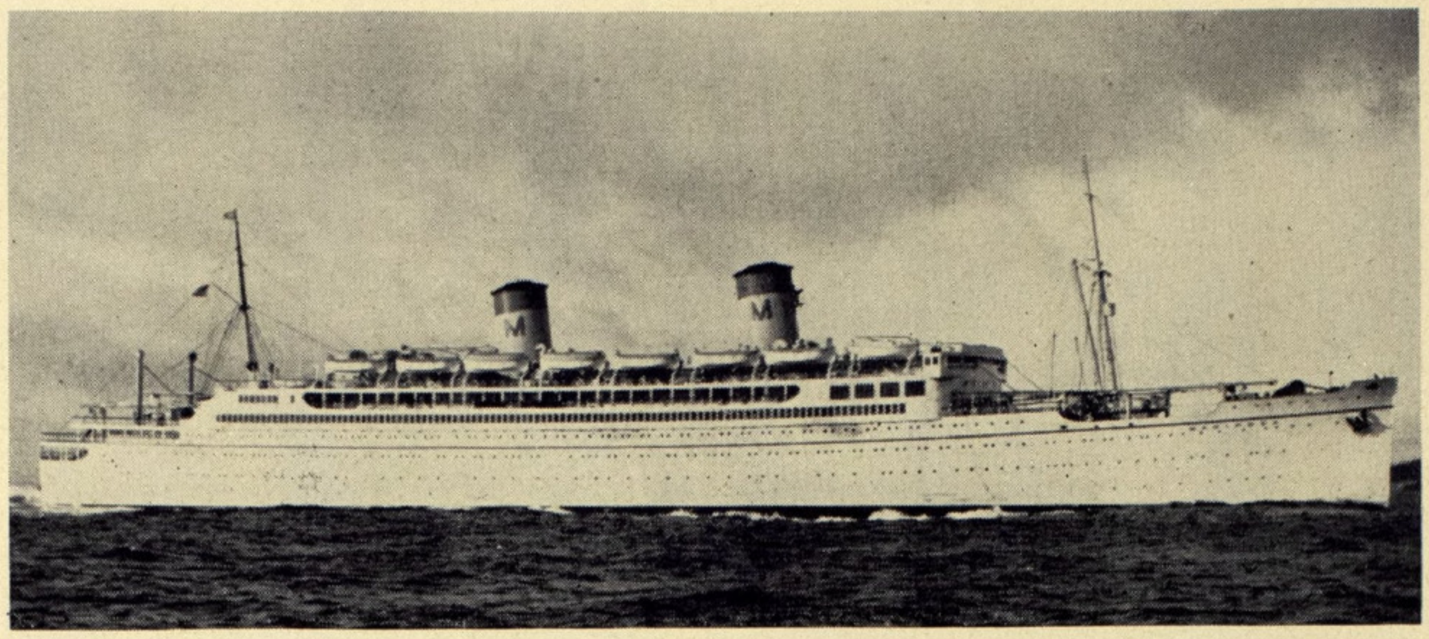
Pumps—Warren Steam Pump Co.
Windlass—American Engineering Co.
Winches—Lidgerwood Mfg. Co.
Steering Engine—American Engineering Co.
Propellers—Newport News S. B. & D. D. Co.
Refrigeration—Brunswick-Kroeschell Co. Pantry and beverage room, Frigidaire
Electric Motors—General Electric Co.
Anchors—General Steel Castings Corp.
Anchor Chain—National Malleable & S. C. Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Windows—Kearfott Engineering Co. Inc.
Thrust Bearings—Kingsbury Machine Works.
Temperature Indicators—Leeds & Northrup
Radio Direction Finder—Mackay Radio & Tel.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Plumbing Fixtures—Standard Sanitary Co.
Blowers and Fans—B. F. Sturtevant Co.
Air Ejectors—Westinghouse Elec. & Mfg. Co.
Fire Protection—Walter Kidde & Co. Inc.
Depth Finder—Submarine Signal Corp.
Deck Covering—Asbestolith Mfg. Co.
Revolution Counters—Cummings
Marine Hardware—The Dayton Mfg. Co.
Oil Purifiers—The DeLaval Separator Co.
Galley Equipment—Edison G. E. Appliance; The Hobart Mfg. Co.; Cleveland Range Co.
Batteries—Electric Storage Battery Co.
Rubber Flooring—The Goodyear Co.
Gypseys, Boat Hoists—Hyde Windlass Co.
Wire Rope—Wickwire Spencer Steel Co.
Relief Valves—Worthington



MARIPOSA—Passenger—Ocean—Twin Screw—Turbine

DESCRIPTION

First of three large fast passenger ships for service between San Francisco and the Antipodes. An outstanding example of modern shipbuilding. In safety she is in excess of the requirements of the convention for safety of life at sea. In decoration and convenience of arrangements her passenger accommodations are comparable to the finest



Name—MARIPOSA
Owner—Matson Navigation Co.
Builder—Bethlehem S. B. Corp., Fore River
Naval Architect—Owner and Builder
Launched—July 18, '31; completed, Dec. 14,
Sister Ships—MONTEREY and LURLINE. The MONTEREY was launched Oct. 10, 1931
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 631 feet 6⅝ inches; length between perpendiculars, 605 feet; breadth molded, 79 feet; depth molded to C deck, 52 feet 9 inches; draft, 28 feet; displacement loaded, 26,141 tons; gross tonnage, 18,017.35; net tonnage, 10,580; passenger capacity, first class, 475; second class, 229; cargo capacity, in cubic feet, 309,622; bunker fuel oil capacity in tons, 6606; speed, at sea, 20½ knots.

MACHINERY PARTICULARS

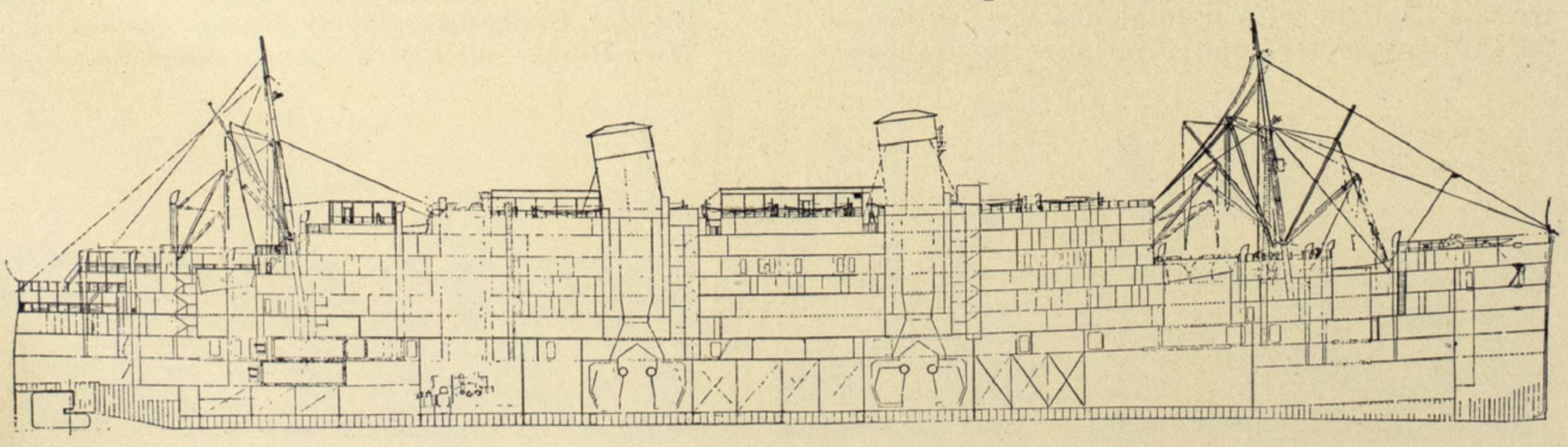
Main Engines—Two, single reduction geared turbines of Bethlehem-Parsons type, built by Bethlehem Shipbuilding Corp., Ltd. The single reduction gearing of double helical type. furnished by Falk Corp. Total horsepower 22,000 at 125 revolutions per minute. For complete description of this vessel and her machinery, see MARINE REVIEW for February, 1932.

Boilers—Twelve, Babcock & Wilcox watertube marine boilers with a total heating surface of 53,520 and total superheating surface of 4760 square feet; 32,112 square feet of air heating surface; working pressure, 375 pounds at superheater outlet; 650 degrees Fahr., total temperature of steam; fuel, oil. Superheaters, desuperheaters, oil burning equipment, feed water regulators, air heaters and furnace brick supplied by Babcock & Wilcox Co. Soot Blowers—Diamond

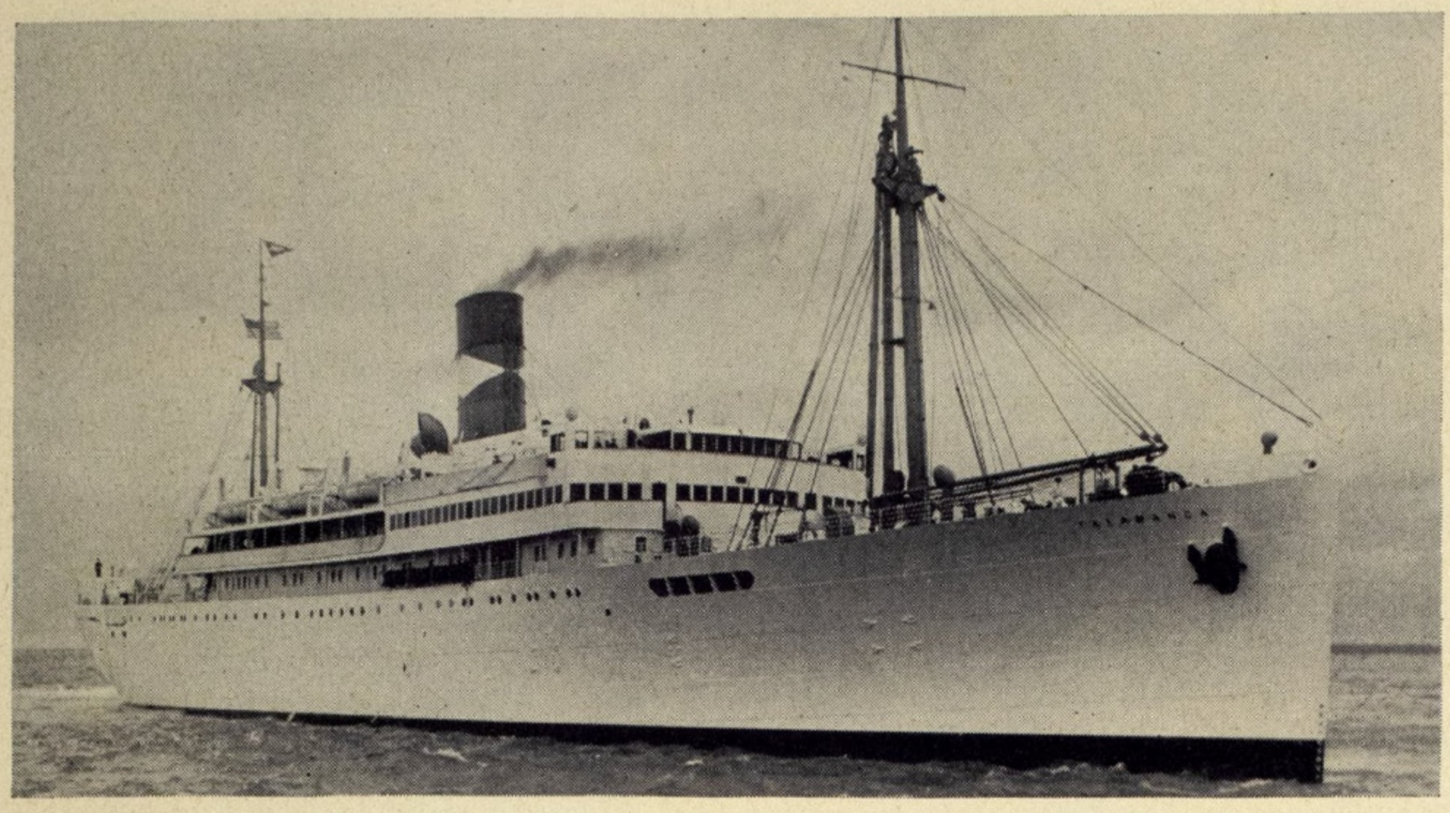
Generating Sets—Four, Westinghouse geared turbine, 500 kilowatts each.

AUXILIARY EQUIPMENT

Pumps—Warren (40); Misc. DeLaval, Northern, Rumsey, Quimby, Nash and Gould
Windlass—Bethlehem Shipbuilding Corp.
Winches—Allan Cunningham
Capstans—American Engineering Co.
Steering Gear—American Eng.; Waterbury
Propellers—Cramp Brass & Iron Foundries
Refrigeration—Brunswick-Kroeschell
Electric Motors—Westinghouse Elec. & Mfg.
Fresh Water Heater—Alco Products Inc.
Anchors—Baldt Anchor Chain & Forge Corp.
Anchor Chain—National Malleable & S. C. Co.
Revolution Counters—Cummings Mach. Wks.
Oil Purifiers—Sharples Specialty Co.
Storage Batteries—Electric Storage Bat. Co.
Galley Equipment—Westinghouse; Hobart Mfg. Co.; The Cleveland Range Co.
Windows—Kearfott Engineering Co.
Thrust Bearings—Kingsbury Mach. Works
Gyro Compass, Pilot—Sperry Gyroscope Co.
Pipe—Reading Iron Co.; A. M. Byers Co.
Deck Covering—Selby, Battersby & Co.
Beds, Springs—The Simmons Co.
Plumbing Fixtures—Standard Sanitary Mfg.
Blowers and Fans—B. F. Sturtevant Co.
Feed Water Heaters, Evaporators, Distillers. Filter—Davis Engineering Corp.
Rubber Flooring—United States Rubber Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Air Ejectors—Westinghouse Elec. & Mfg. Co.
Laundry Machinery—American Laundry Machinery Co.
Compasses (Magnetic)—Kelvin White Co.
Air Compressor—Worthington



TALAMANCA—Passenger—Ocean—Twin Screw—Electric



Name—TALAMANCA
Owner—United Mail Steamship Co.
Builder—Newport News S. B. & D. D. Co.
Naval Architect—Newport News S. B. & D. D.
Launched—Aug. 15, '31; comp. Dec. 12, '31.
Sister Ships—SEGOVIA, CHIRIQUI (at Newport News). Launched respectively, Aug. 15, '31; Nov. 14, '31; comp., (SEGOVIA damaged by fire) CHIRIQUI, March 15, '32. ANTIGUA, QUIRIGUA, VERAGUA (at Bethlehem Shipbuilding Corp.) Launched respectively (first two) Dec. 12, '31, Feb. 6, '32.
Classification—American Bureau of Shipping.

HULL PARTICULARS

Length over all, 446 feet 9½ inches; length between perpendiculars, 415 feet; breadth molded, 60 feet; depth molded, to upper deck, 34 feet 9 inches; draft, 24 feet; displacement loaded, 10,930 tons; gross tonnage, 6963; net tonnage, 3183; passenger capacity, first class only, 113, cargo capacity, 2000 tons and in cubic feet, 195,700; bunker fuel oil capacity in tons, 1450; speed at sea, 17½ knots.

MACHINERY PARTICULARS

Main Engines—Two, General Electric turbine generating units and two electric motors direct connected to propellers. Total horsepower, 10,500 at 125 revolutions per minute. Machinery and vessel described in MARINE REVIEW, for January, 1932. The generators are alternating current and are each of 4200 kilowatts capacity.

Boilers—Four, Babcock & Wilcox watertube marine boilers with a total heating surface of 22,492 square feet and total superheating surface of 2248 square feet; working pressure, 350 pounds; 230 degrees Fahr. superheat; fuel, oil. Superheaters, de-superheaters, feed water regulators and fire brick supplied by Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty

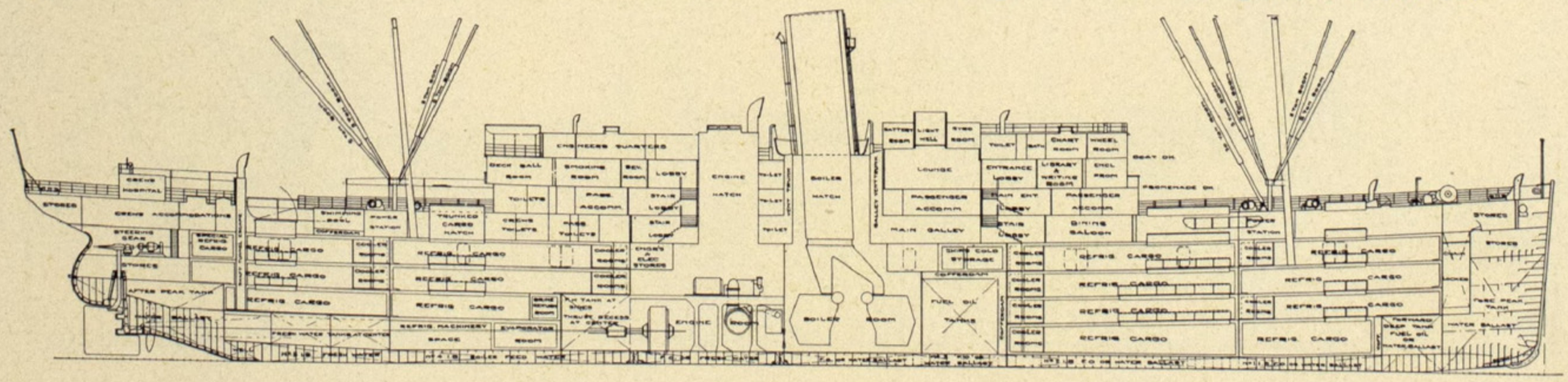
Auxiliary Generators—Three, geared turbine, direct current, General Electric, each of 500 k. w.

DESCRIPTION

First of six fast fruit and passenger, twin screw, electric drive steamships for the Great White fleet. Three of these ordered from the Newport News Shipbuilding & Dry Dock Co. and three from the Bethlehem Shipbuilding Corp. Completely rerrigerated for carrying fruit, especially bananas, embodying many advanced ideas in mechanical refrigeration. Modern Spanish is the dominant note in the design and furnishings of public spaces.

AUXILIARY EQUIPMENT

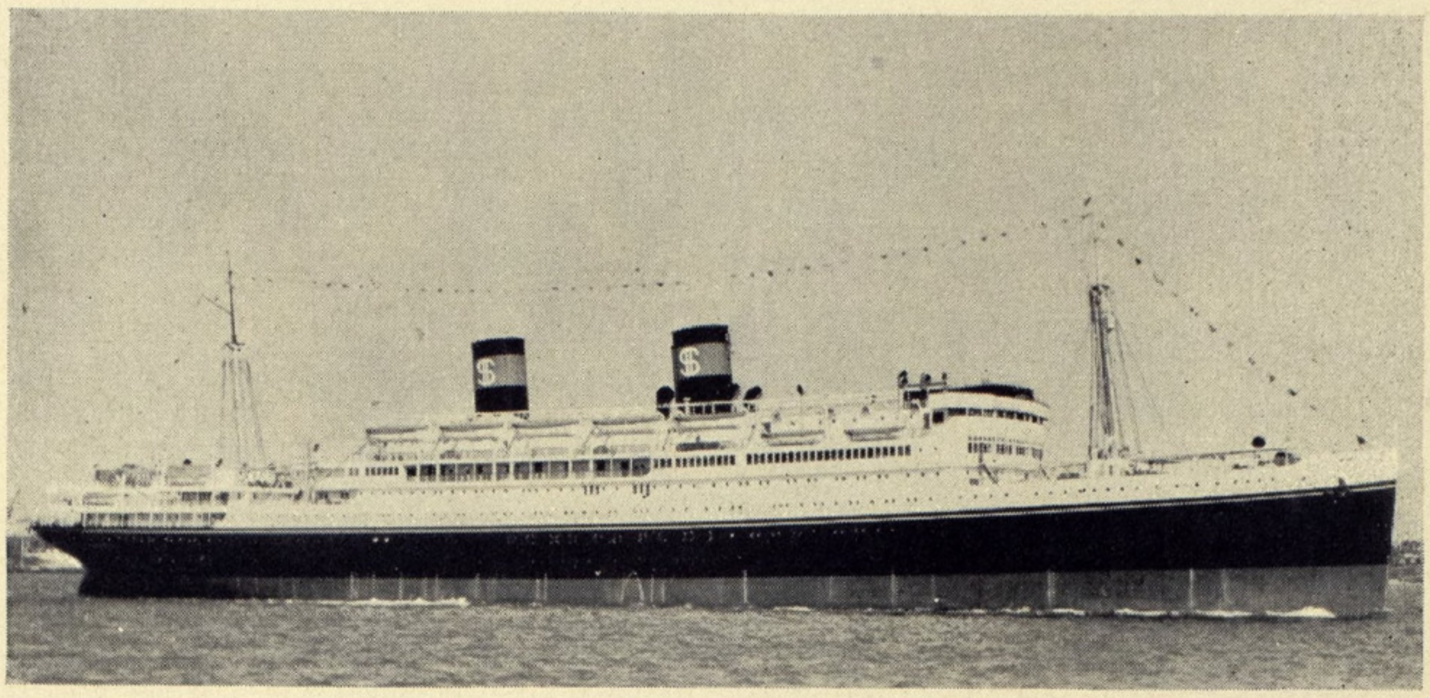
Pumps—Warren Steam Pump Co.
Windlass—Hyde Windlass Co.
Winches—Lidgerwood Mfg. Co.
Steering Engine—American Engineering Co.
Propellers—Cramp Brass & Iron Foundries
Refrigeration—York Ice Machinery Corp.
Oil Burning Equip.—Todd Shipyards Corp.
Feed Water Heaters—Alco Products Inc.
Gypseys, Hoists—American Engineering Co.
Anchors and Chain—Baldt A. C. & Forge
Ice Boxes, Coolers—General Electric Co.
Revolution Counters—Cummings Mach. Wks.
Oil Purifiers—The DeLaval Separator Co.
Galley Equipment—Edison G. E. Appliance; Hobart Mfg. Co.; Cleveland Range Co.
Storage Batteries—Edison Storage Battery
Windows—Kearfott Engineering Co.
Thrust Bearings—Kingsbury Machine Works
Conductivity Indicators—Leeds & Northrup
Valves—The Lunkenheimer Co.
Pipe—Reading Iron Co.
Deck Covering—Selby, Battersby & Co.
Rubber Flooring—United States Rubber Co.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Rudder Indicator—Sperry Gyroscope Co.
Wire Rope—Wickwire Spencer Steel Co.



PRESIDENT COOLIDGE—Passenger—Ocean—Twin Screw—Electric

DESCRIPTION

The PRESIDENT COOLIDGE and the PRESIDENT HOOVER are practically sister ships, the only difference being that the turbine electric propelling machinery and electric auxiliaries for the PRESIDENT COOLIDGE were furnished by the Westinghouse Electric & Mfg. Co. Both vessels are engaged in the service from New York to the Orient; the PRESIDENT COOLIDGE sailed on Oct. 15, 1931.



Name—PRESIDENT COOLIDGE
Owner—Dollar Steamship Lines Inc., Ltd.
Builder—Newport News S. B. & D. D. Co.
Naval Architect—Newport News S. B. & D. D. Co.
Launched—Feb. 21, '31; comp. Oct. 1, '31
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 654 feet, 3 inches; length between perpendiculars, 615 feet; breadth molded, 81 feet; depth molded to shelter deck at side, 52 feet; draft loaded, 32 feet; displacement loaded, 31,441 tons; gross tonnage, 21,936; net tonnage, 13,029; passenger capacity, first class, 307; special class, 133; third class, 170; steerage, 378; cargo capacity, 8000 tons, and in cubic feet, nonrefrigerated, 549,400, refrigerated, 59,450; bunker fuel oil capacity in tons, 6244; speed at sea, 20 knots.

MACHINERY PARTICULARS

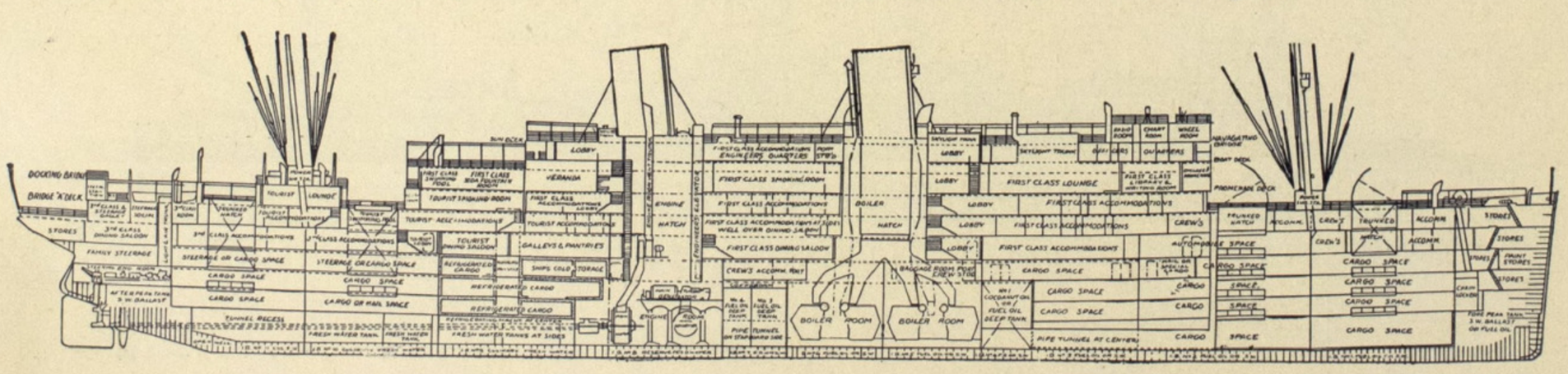
Main Engines—Two, Westinghouse turbine generating units and two electric motors direct connected to propellers. Total horsepower, 26,500 at 133 revolutions per minute. Machinery and vessel described in MARINE REVIEW for November, 1931. The generators are alternating current and are each of 10,200 kilowatts capacity.

Boilers—Twelve, Babcock & Wilcox watertube marine boilers with a total heating surface of 57,624 square feet and total superheating surface of 5700 square feet; working pressure, 300 pounds; 200 degrees Fahr. superheat; fuel, oil. Superheaters, de-superheaters, feed water regulators, oil burning equipment and fire brick, all supplied by Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty Corp.

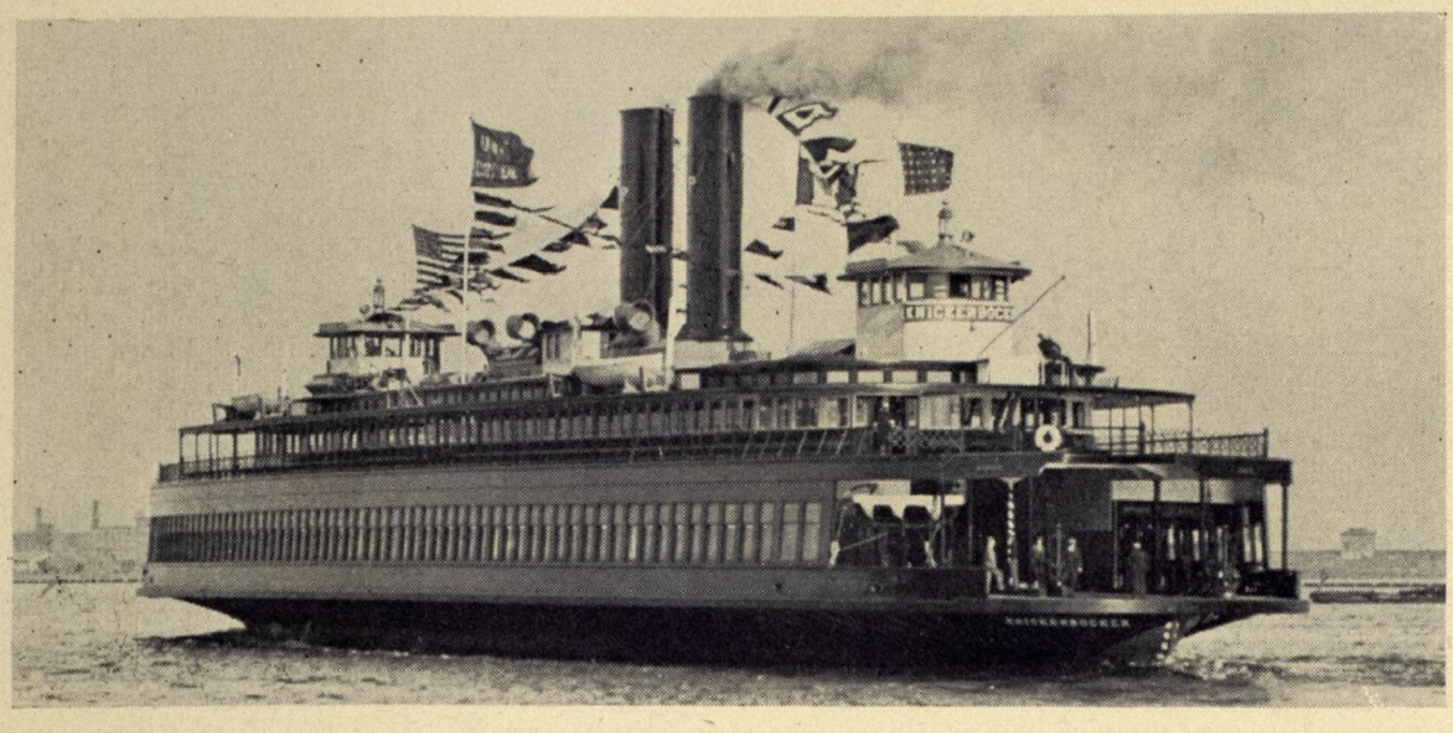
Auxiliary Generators—Four, turbine geared, each 500 kilowatts, Westinghouse Electric & Mfg. Co.

AUXILIARY EQUIPMENT

Pumps—Warren Steam Pump Co.
Windlass—American Engineering Co.
Winches—Lidgerwood Mfg. Co.
Steering Engine—American Engineering Co.
Propellers—Newport News S. B. & D. D. Co.
Refrigeration—Brunswick-Kroeschell Co. Pantry and beverage room—Frigidaire
Electric Motors—Westinghouse Elec. & Mfg.
Anchors—General Steel Castings Corp.
Anchor Chain—National Malleable & S. C. Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Windows—Kearfott Engineering Co. Inc.
Thrust Bearings—Kingsbury Machine Works
Temperature Indicators—Leeds & Northrup
Radio Direction Finder—Mackay Radio & Tel.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Plumbing Fixtures—Standard Sanitary Mfg.
Blowers and Fans—B. F. Sturtevant Co.
Air Ejectors—Westinghouse Elec. & Mfg. Co.
Fire Protection—Walter Kidde & Co. Inc.
Depth Finder—Submarine Signal Corp.
Deck Covering—Asbestolith Mfg. Co.
Revolution Counters—Cummings
Marine Hardware—The Dayton Mfg. Co.
Oil Purifiers—The DeLaval Separator Co.
Galley Equipment—Edison G. E. Appliance, Hobart Mfg. Co., Cleveland Range Co.
Batteries—Electric Storage Battery Co.
Rubber Flooring—Goodyear Tire & Rubber
Gypseys, Boat Hoists—Hyde Windlass Co.
Wire Rope—Wickwire Spencer Steel Co.
Relief Valves—Worthington



KNICKERBOCKER—Ferry—Double Ended—Single Screw—Steam



Name—KNICKERBOCKER
Owner—City of New York
Builder—United Dry Docks, Staten Island
Naval Architect—Robert W. Morrell
Launched—Sept. 1, '31; comp., Oct. 31, '31
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 267 feet; length between perpendiculars, 254 feet; breadth molded, 46 feet, (over guards 66 feet); depth molded, 19 feet 9 inches; draft, (light operating) 12 feet 6 inches; displacement (light operating), 1785 tons; gross tonnage, 2045; net tonnage, 1391; passenger capacity, 2300; cargo capacity, 32 vehicles; bunker fuel capacity, in tons, (2240 pounds each) 110; speed, 15½ knots.

MACHINERY PARTICULARS

Main Engines—Two, vertical, direct acting, 2-cylinder compound, surface condensing, coupled together, built by the United Dry Docks, Inc., Staten Island plant. Size, 22½ by 50 inches and 30-inch stroke; horsepower, 3570 at 136 revolutions per minute.

Boilers—Four, Babcock & Wilcox watertube marine boilers with a total heating surface of 14,308 square feet; working pressure, 225 pounds per square inch; oil burning equipment, Todd Shipyards Corp.; fuel, oil.

Auxiliary Generators—Two, each of 25 kilowatts, General Electric.

AUXILIARY EQUIPMENT

Pumps—Worthington; Dean; United
Steering Engine—Hyde Windlass Co.
Propellers—Two solid cast steel, 4-bladed, General Steel Castings Co.
Revolution Counters—Cummings Mach. Wks.
Anchors—General Steel Castings Corp.
Stern Bearings—B. F. Goodrich Rubber Co.
Valves—The Lunkenheimer Co.

On the main deck outboard of the vehicle driveways are steel cabins, for men and women respectively, toilets, restroom and stairways leading to the upper deck. On the upper deck is a salon cabin and above this is the boat deck on which are located the two pilot houses, and officers' locker room, fidleys and lifeboats.

The rudders are of balanced type with cast steel frames filled with wood and fitted with side plates. Steam and hand steering gear is fitted for each end of the boat. Four 24-foot metallic lifeboats are provided on the boat deck and are served by mechanical davits.

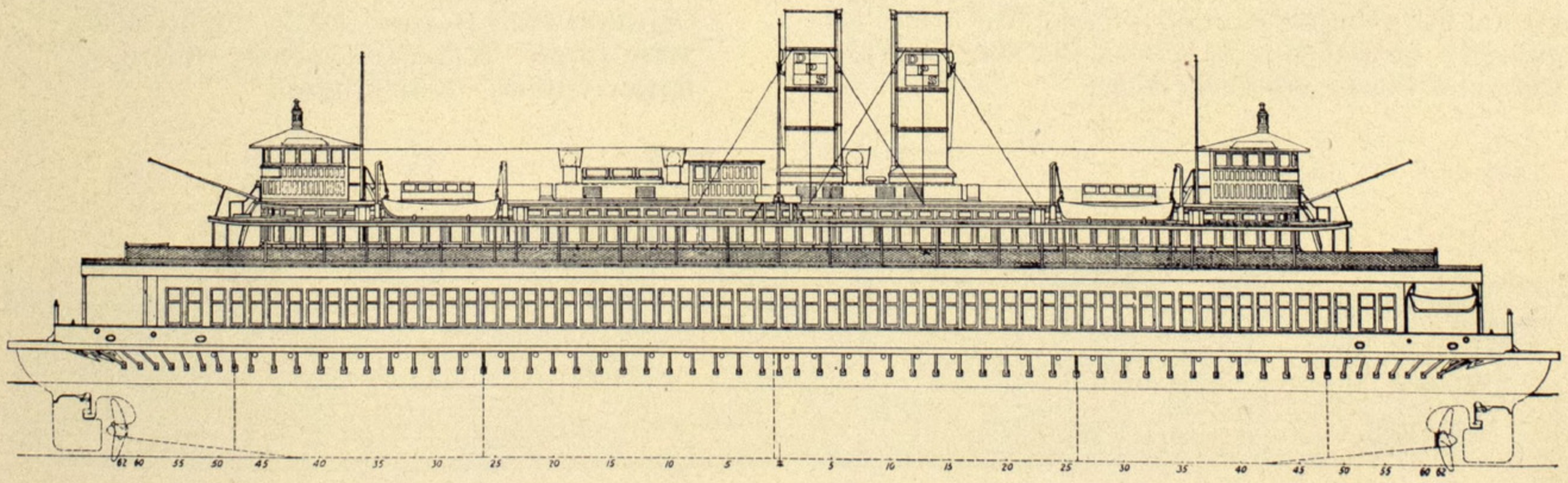
Interior of the cabins on the main deck is sheathed with plates of Armco iron. The upper and boat decks are of joiner construction and the decks in all cabins are covered with linoleum. Superstructure decks outside the cabins are covered with canvas.

The two main vertical compound engines are coupled together on a through shaft. A thrust bearing of horseshoe type is fitted at each end of the engine. The stern bearings are of the Cutless rubber type.

Each boiler is supplied with forced draft by a separate turbine driven blower of Sturtevant make, each having a capacity of 10,700 cubic feet of free air per minute.

DESCRIPTION

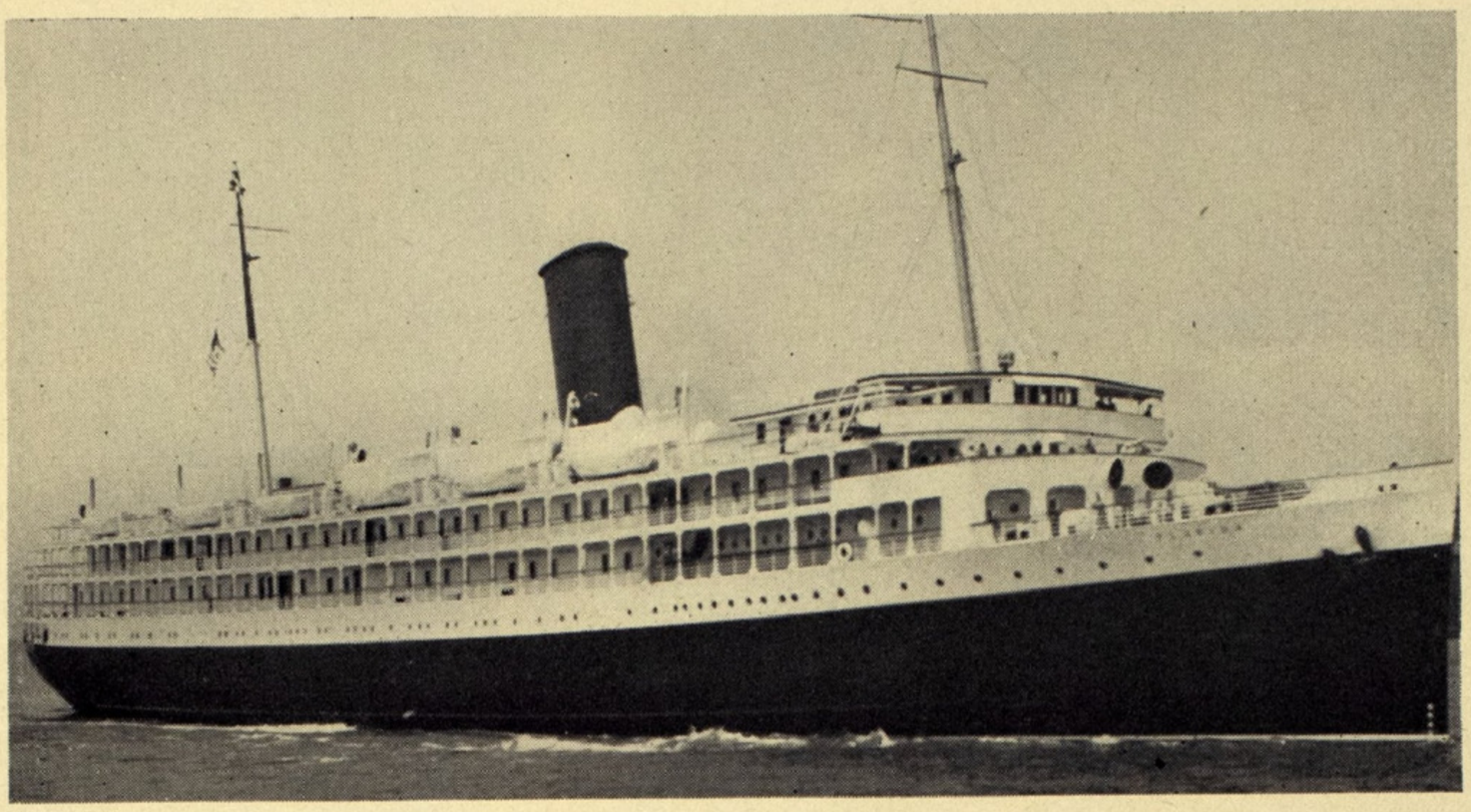
This vessel is a duplicate of the DONGAN HILLS and TOMPKINSVILLE, built by the same company in 1929 and 1930, respectively. She is now in service between Staten Island and Manhattan. A double ended ferry boat with single screw drive at each end by means of a through shaft. The hull is of steel, framed on the transverse system and subdivided by watertight bulkheads.



FLORIDA—Passenger—Ocean—Twin Screw—Turbine

DESCRIPTION

Fast, over-night, passenger and freight, twin screw steamship engaged in service between Florida ports and Havana. Of complete superstructure type, with three decks in hull proper and seven watertight transverse bulkheads extending to upper deck; in excess of requirements of 1929 convention for safety of life at sea. Particular care taken to provide efficient ventilation.



Name—FLORIDA
Owner—Peninsular & Occidental S. S. Co.
Builder—Newport News S. B. & D. D. Co.
Naval Architect—Carroll S. Smith
Launched—March 7, '31; comp., May 20, '31
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 387 feet 8 inches; length between perpendiculars, 365 feet; breadth molded, 56 feet 6 inches; depth molded, 28 feet 6 inches; draft, 18 feet; displacement loaded, 5886 tons; gross tonnage, 4923; net tonnage, 2698; passenger capacity, first class, 612; second class, 130; cargo capacity, 1000 tons and in cubic feet, 83,700; bunker fuel oil capacity in tons, 700; speed at sea, 19½ knots.

MACHINERY PARTICULARS

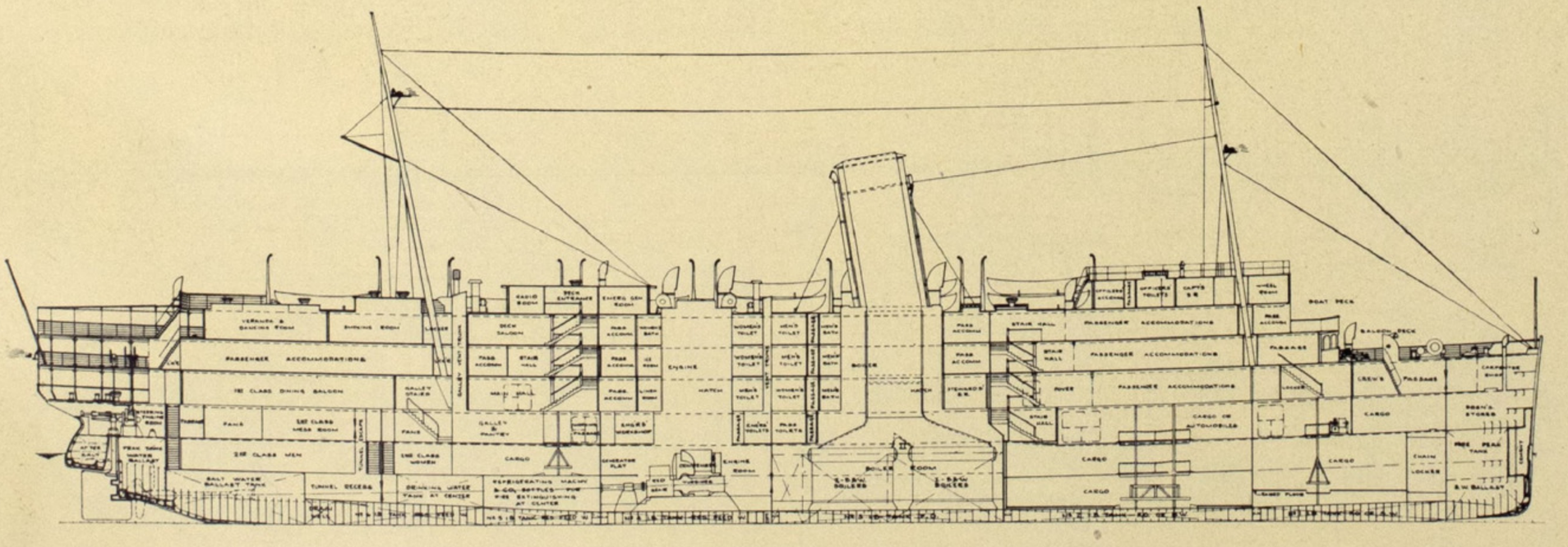
Main Engines—Two, geared turbines, by Newport News Shipbuilding & Dry Dock Co. and gears by DeLaval Steam Turbine Co. Type, Parsons cross-compound, single reduction gears; total horsepower, 9500 at 163 revolutions per minute. For complete description of this vessel, see MARINE REVIEW for June, 1931.

Boilers—Four, Babcock & Wilcox watertube marine boilers with a total heating surface of 28,760 square feet; working pressure, 250 pounds; fuel, oil; feed water regulators and furnace brick supplied by Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty Corp.

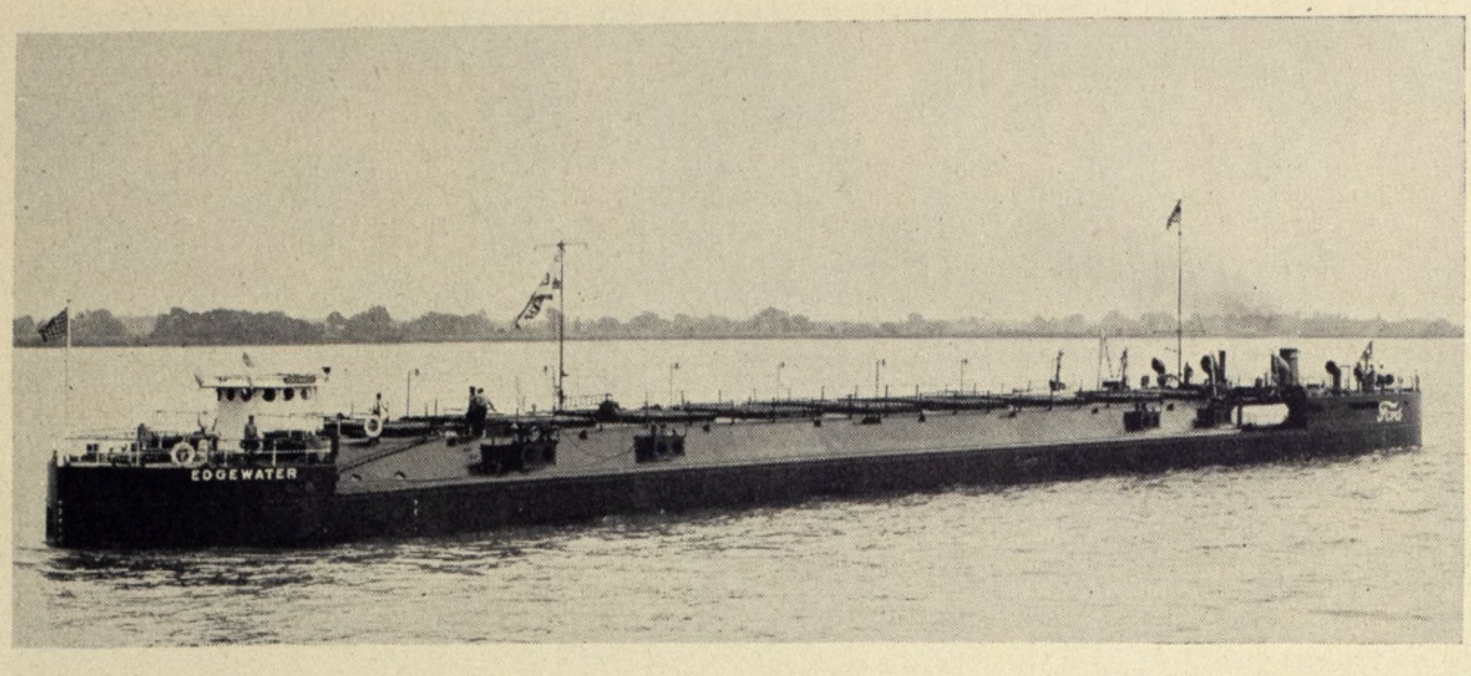
Auxiliary Generators—Three, turbine, Westinghouse, each 75 kilowatts.

AUXILIARY EQUIPMENT

Pumps—Warren Steam Pump Co.
Windlass—American Engineering Co.
Freight Elevator—M. L. Bayard & Co.
Steering Engine—American Engineering Co.
Refrigeration—I. P. Morris & De La Vergne
Oil Burning Equip.—Todd Shipyards Corp.
Electric Motors—Diehl Mfg. Co.
Motor Generator—Diehl Mfg. Co.
Storage Batteries—Electric Storage Battery
Fresh Water Heater—Davis Engineering Corp.
Steam Gypsey—American Engineering Co.
Deck Covering—Asbestolith Mfg. Co.
Revolution Counters—Cummings Mach. Works
Oil Purifiers—The DeLaval Separator Co.
Anchors—General Steel Castings Corp.
Anchor Chain—National Malleable Co.
Rubber Flooring—Goodyear Tire & Rub. Co.
Thrust Bearings—Kingsbury Mach. Works
Searchlights—Sperry Gyroscope Co.
Plumbing Fixtures—Standard Sanitary Mfg.
Ventilating Fans—Sturtevant, Diehl
Lifeboats, Davits—Welin Davit & Boat Corp.
Wire Rope—Wickwire Spencer Steel Co.



EDGEWATER—Barge Canal—Lakes—Twin Screw—Turbine



Name—EDGEWATER
Owner—Ford Motor Co.
Builder—Great Lakes Engineering Works
Naval Architect—Henry J. Gielow, Inc.
Launched—May 9, '31; comp., Aug. 10, '31
Sister Ship—CHESTER, launched May 16, 1931; completed, Aug. 23, 1931
Classification—Lloyd's Register of Shipping

HULL PARTICULARS

Length over all, 300 feet; length between perpendiculars, 288 feet; breadth molded, 43 feet; depth molded, 20 feet; draft, 12 feet 6 inches; gross tonnage, 1819; net tonnage, 1384; cargo capacity, 2600 tons (2000 pounds each) and in cubic feet, 140,000; bunker fuel capacity in tons (2000 pounds each), 188; speed, in service, 10½ knots.

MACHINERY PARTICULARS

Main Engines—Two, steam turbine reduction geared units, built by Westinghouse Electric & Mfg. Co. Size, each, 800 shaft horsepower; total 1600 horsepower at 250 revolutions per minute of propellers.

Boilers—Two, watertube marine boilers with water walls and economizer; built by Combustion Engineering Corp. Size, 21,000 pounds of steam; working pressure, 400 pounds per square inch; superheat, 200 degrees Fahr.; fuel, oil. Soot Blowers—Diamond Specialty Corp.

Auxiliary Generators—Two turbine generator sets, 50 kilowatts each, Westinghouse.

DESCRIPTION

This vessel and her sister ship the CHESTER are designed for handling general cargo between the Great Lakes and the Atlantic coast ports by way of the New York state barge canal. All heights above deck are kept to a minimum to come within bridge clearance in the barge canal of a little over 15 feet. Pilot house is raised and lowered by an electrically driven hydraulic gear.

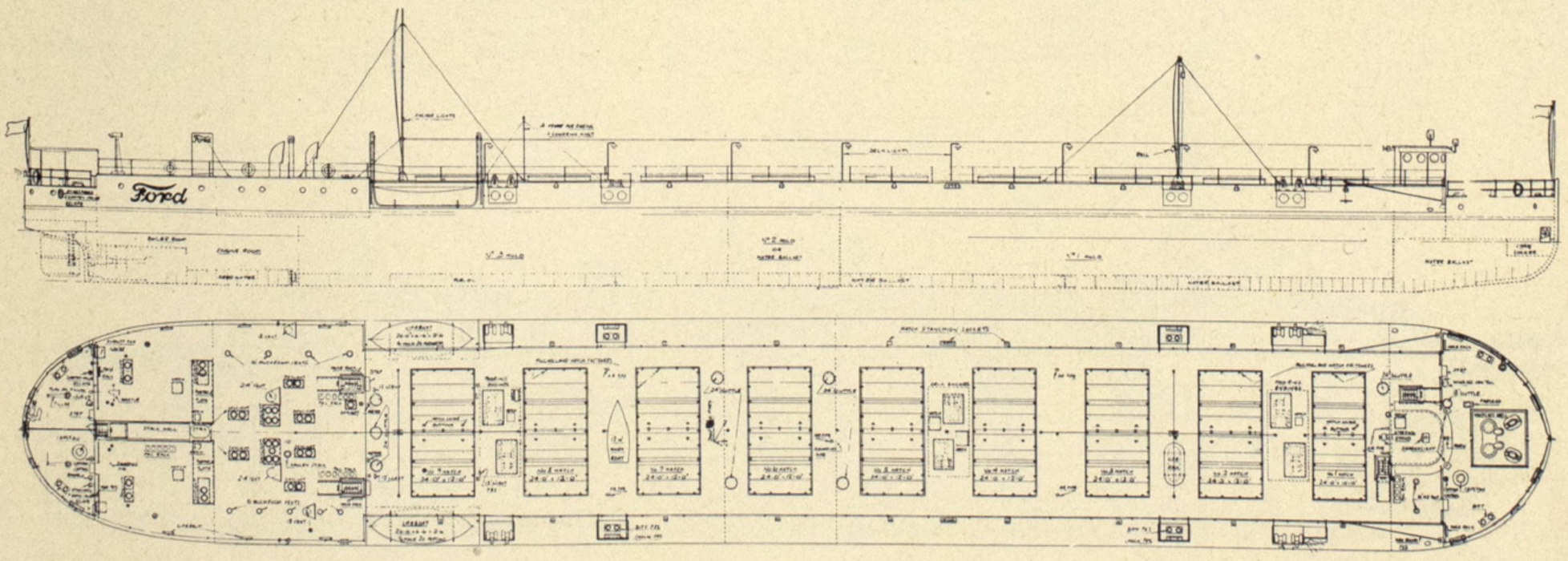
AUXILIARY EQUIPMENT

Pumps — Worthington; Quimby; Westinghouse; Nash
Windlass—Hyde Windlass Co.
Mooring Machines—Benson Electric Co.
Steering Engine—Benson Electric Co.
Gyro Compass—Sperry Gyroscope Co.
Propellers—Ferguson & Co.
Pilot House Control—Sperry Gyro. Co.
Refrigeration—Detroit Ice Machine Co.
Oil Burners—Peabody Engineering Corp.
Oil Purifier—The Sharples Specialty Co.
Condensers—Westinghouse Electric
Fuel Oil Heaters—Westinghouse
Induced Draft Fans—Westinghouse
Feed Water Heaters—Westinghouse
Marine Hardware—The Dayton Mfg. Co.
Economizers—Foster Wheeler Corp.
Superheaters—Foster Wheeler Corp.
Anchor Chain—National Malleable & S.C. Co.
Stern Bearings—B. F. Goodrich Rubber Co.
Thrust Bearings—Kingsbury Machine Works

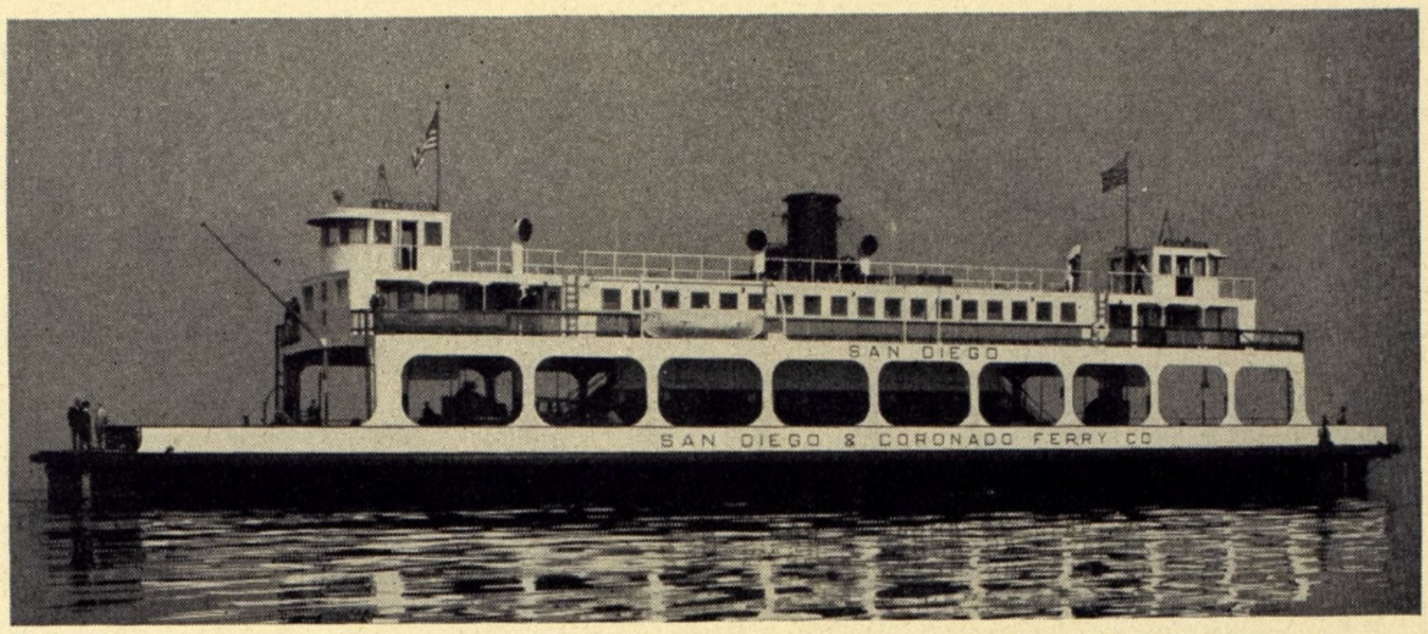
The EDGEWATER and the CHESTER have the distinction of being the first cargo vessels built on the Great Lakes to be equipped with geared turbine drive.

The power units occupy only 30 feet of the over all length and are situated in the after end. Crew's quarters are aft and officers' quarters are forward. Cargo space is served by nine telescopic hatches.

The ships were built in the short period of less than five months, between the date of signing of contract and first trial trips.



SAN DIEGO—Ferry—Double Ended—Diesel Electric



DESCRIPTION

A two-deck, single screw (one propeller at each end), double ended ferry boat for automobiles and passengers between San Diego and Coronado, Calif., a distance of 2900 feet between slips. A special effort was made in the design of lines, propellers and the control of various engine speeds to give maximum acceleration and deceleration for 4-minute runs.

Name—San Diego
Owner—San Diego & Coronado Ferry Co.
Builder—The Moore Dry Dock Co.
Naval Architect—W. J. Pollock
Launched—Sept. 14, '31; comp., Nov. 9, '31
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 204 feet 7½ inches; length between perpendiculars, 192 feet 8 inches; breadth molded, 43 feet 6 inches; breadth extreme, 59 feet 11½ inches; draft, light normal, 10 feet 5 inches; displacement, light normal, 779 tons; gross tonnage, 556 tons; net tonnage, 378; passenger capacity, salon deck, 200; automobile capacity, main deck, 58; oil fuel capacity, in tons, 23; speed on trials, 13.13 knots.

MACHINERY PARTICULARS

Main Engines—Three, 6-cylinder, 4-cycle, mechanical injection diesel engines, built by the Atlas Imperial Diesel Engine Co. Cylinder diameter, 12½ inches; stroke, 16 inches. Each engine develops 350 horsepower at 275 revolutions per minute and is direct connected to an electric generator and exciter.

Main Generators—Three, each of 225 kilowatts, 167 volts, shunt wound, direct current, with an over-hanging 30-kilowatt, 125-volt direct current exciter attached; built by Westinghouse Electric & Mfg. Co.

Main Propulsion Motors—Two, each of 750 shaft horsepower, 500 volts, 150/180 revolutions per minute, direct current, shunt wound, single armature, pedestal type bearings and separately excited at 125 volts; built by Westinghouse Electric & Mfg. Co. Each propulsion motor is connected to a propeller at each end. Propellers, two, one at each end, cast iron, four-bladed, 7 feet 6 inches diameter, 9 feet pitch.

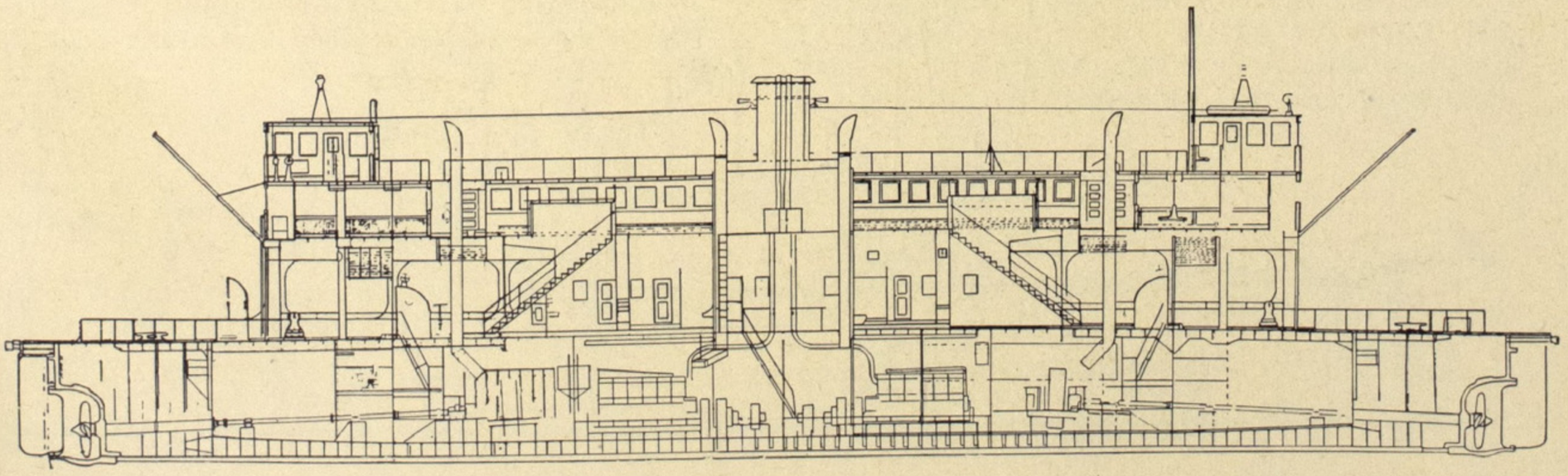
Auxiliary Generators—The three attached, 30 kilowatts each, exciters referred to above under main generators furnish excitation for the main generators and propelling motors and power for auxiliary purposes.

AUXILIARY EQUIPMENT

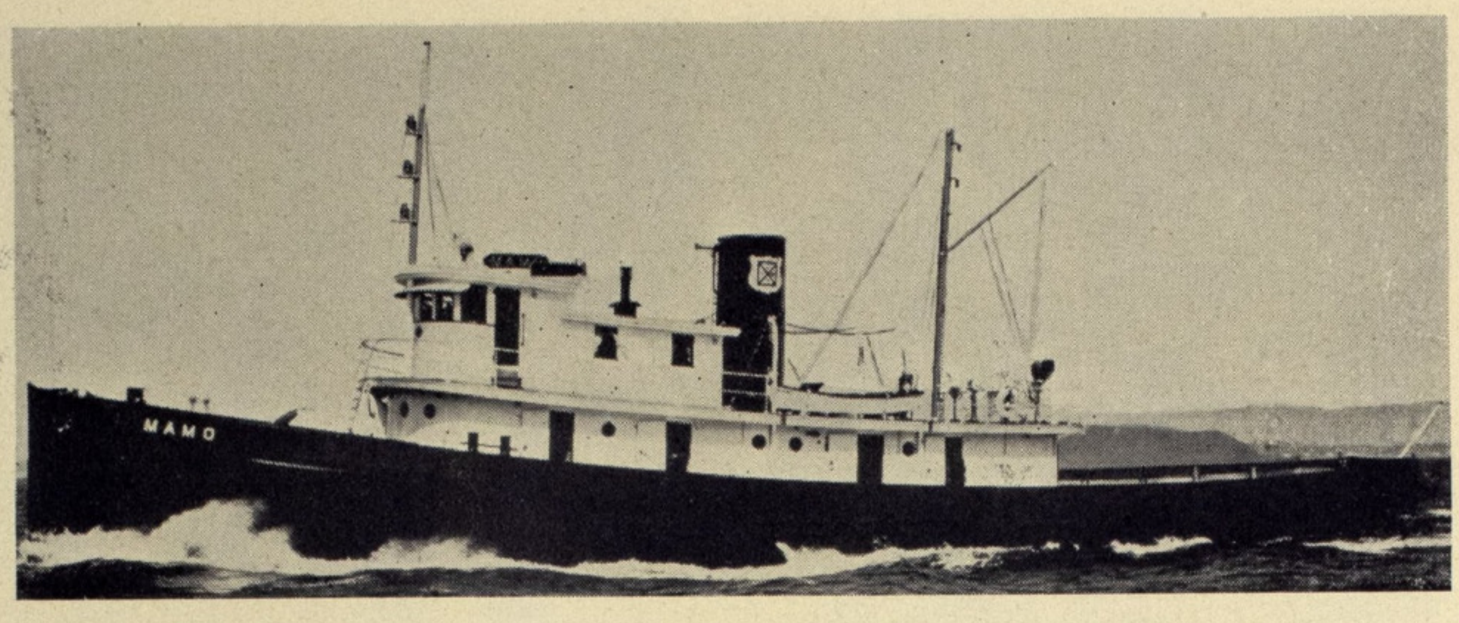
Capstans—Two No. 4 Hyde Windlass Co.
Steering Gear—Allan Cunningham
Oil Purifier—The Sharples Specialty Co.
Air Compressors—Main and Auxiliary, Rix
Thrust Bearings—Kingsbury Machine Works
Stern Bearings—B. F. Goodrich Rubber Co.
Auxiliary Generator—Jenison gasoline motor and Westinghouse generator
Pilot House Control—Westinghouse
Air Whistle—Allan Cunningham
Air Cooler—Schutte & Koerting Co.
Pumps—Warren; Woodin & Little; Romec
Electric Motors—Westinghouse
Marine Hardware—The Dayton Mfg. Co.

The hull of this vessel up to the automobile deck is of steel on the transverse system of framing and is subdivided by six steel watertight bulkheads. The automobile deck is a caulked wood deck on steel beams and tie plates and is sheathed with cedar.

Top sides are of the open panel type, a feature desirable when housing automobiles in an all-year mild temperature.



MAMO—Tug—Twin Screw—Diesel Direct Drive



DESCRIPTION

The MAMO is a twin screw ocean-going diesel tug, for Hawaiian inter-island service, constructed of steel on the transverse system of framing, with a graceful sheer, straight stem and elliptical stern. The propelling machinery is located amidships, with deep fuel oil tank immediately forward and aft. Speed on trial was 11.41 knots.

Name—MAMO
Owner—Young Brothers Ltd.
Builder—Bethlehem S. B. Corp., Union Plant
Naval Architect—L. H. Coolidge
Launched—Feb. 14, '31; comp. Mar. 26, '31
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 129 feet 2 inches; length between perpendiculars, 120 feet; breadth molded, 28 feet; depth molded, 15 feet 2 inches; draft molded, 12 feet; displacement loaded, 575 tons; gross tonnage, 332; net tonnage, 28; bunker fuel capacity in tons, 150; deadweight at 12-foot draft, 162 tons; speed, 11½ knots.

MACHINERY PARTICULARS

Main Engines—Two, Fairbanks-Morse, 5 cylinder, 16 inches by 20 inches, 750 brake horsepower each, 2-cycle diesel engines of the pump scavenging, solid injection type, direct connected to 88 inches diameter by 55½ inches pitch, four-bladed bronze propellers, developing the rated horsepower at 260 revolutions per minute.

Auxiliary Generators—Two Fairbanks-Morse, 3-cylinder, 6 inches by 6½ inches, 800 r.p.m., 45 brake horsepower diesel engines with direct connected 30 kilowatts, 125-volt direct current generators on one end, and 50 cubic foot, 2-stage, air compressors, clutch connected to opposite end, all mounted on cast iron sub-base.

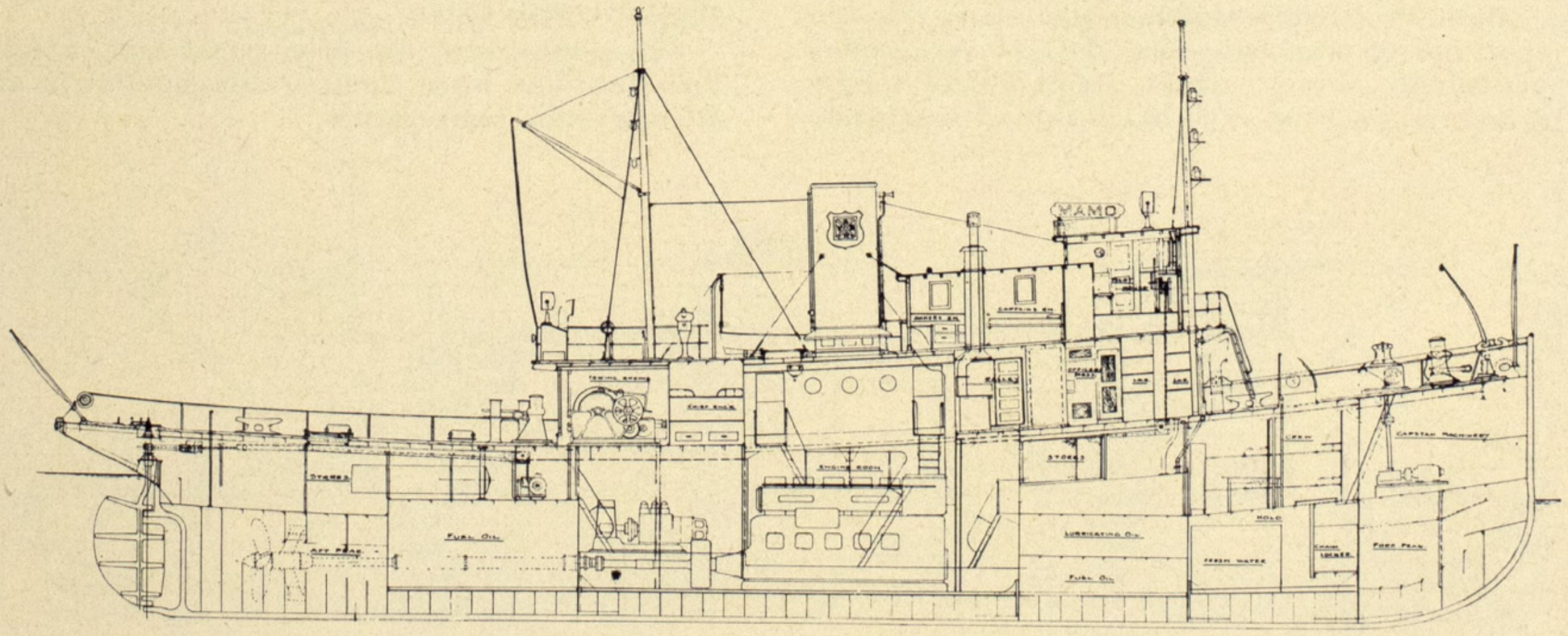
AUXILIARY EQUIPMENT

Pumps—Fairbanks-Morse & Co.
Capstan-Windlass—Allan Cunningham
Steering Engine—Allan Cunningham.
Propellers—Coolidge Propeller Co.
Towing Machine—Allan Cunningham
Refrigeration—Frigidaire Sales Corp.
Electric Motors—Fairbanks Morse & Co.
Oil Purifier—The DeLaval Separator Co.
Storage Batteries—Edison Storage Bat. Co.
Whistle—Allan Cunningham
Thrust Bearings—Kingsbury Mach. Works

This vessel is said to be the largest diesel tug under American registry and is in every respect fitted for the longest voyages on the high seas, though she is intended for service among the islands of the Hawaiian group.

There are two deck houses for the accommodations of officers. The upper house on the navigating deck is built of wood and accommodates the wheelhouse, captain's and owner's rooms. An inside stairway leads down to the large steel house located on the main deck, which contains the chief engineer's room, mates room, galley, officers' and crew's mess room, bathrooms, engine hatch and towing machine room. The remainder of the crew are berthed on the lower deck forward.

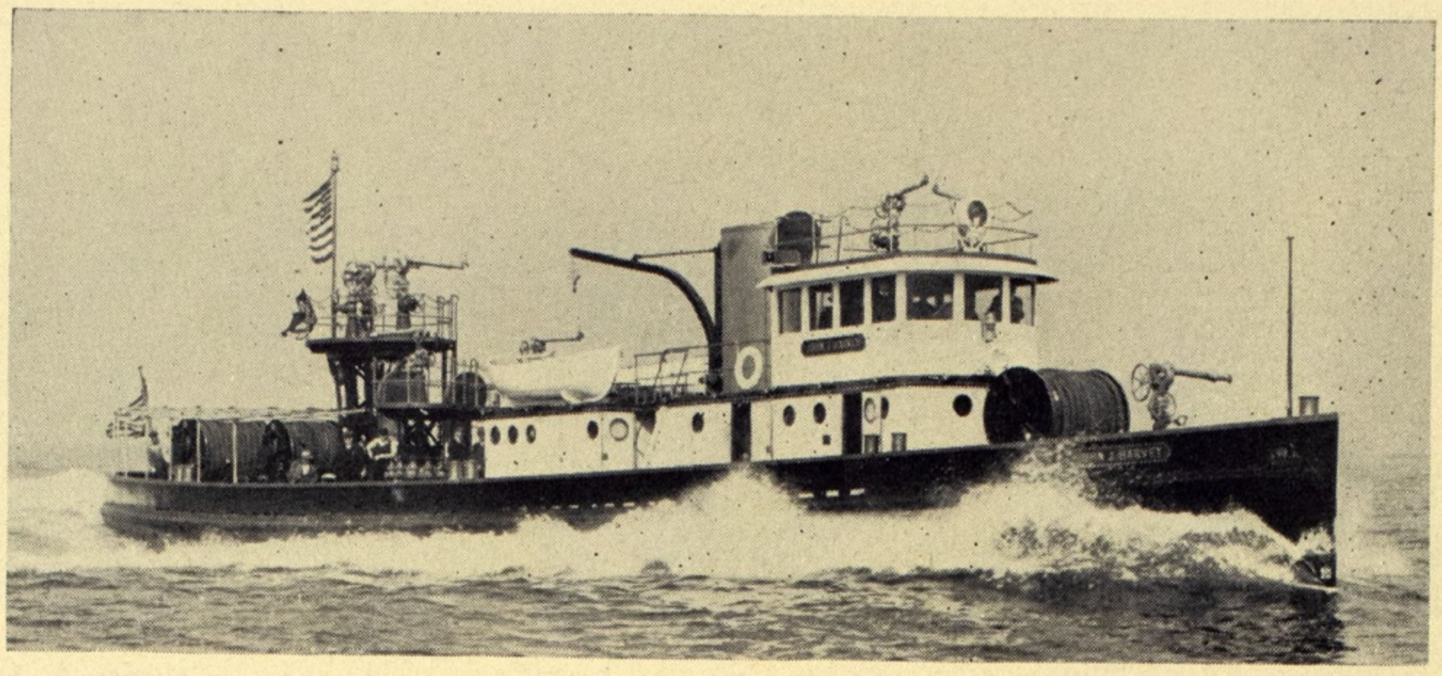
The vessel is equipped with an Allan Cunningham towing machine driven by a 50-horsepower electric watertight motor with an electro-magnetic brake and an automatic wire tension control. The towing engine has one drum suitable to handle 1600 feet of 1¾-inch diameter cable.



JOHN J. HARVEY—Fireboat—Harbor—Twin Screw—Electric

DESCRIPTION

Said to be the largest and most powerful fireboat in the world. An all-steel, twin screw, gasoline-electric vessel with propulsive power for a speed of 18 miles per hour and pumping power to supply 16,000 gallons of water per minute from eight nozzles. There are five gasoline engines, each of 548 h.p. Each engine is direct connected to a 340 kilowatts direct current generator.



Name—JOHN J. HARVEY
Owner—City of New York
Builder—Todd Dry Dock Eng. & Repair Corp.
Naval Architect—Henry J. Gielow, Inc.
Launched—Oct. 6, '31; completed, Dec., 1931
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 130 feet; length between perpendiculars, 123 feet; breadth molded, 28 feet; depth molded, 12 feet 9 inches; draft molded, 8 feet 6 inches; displacement loaded, 440 tons; gross tonnage, 268.8; net tonnage, 182.78; bunker fuel capacity in gallons of gasoline, 6000; speed, in service, 18 miles per hour.

MACHINERY PARTICULARS

Main Engines—Gasoline-electric. Five, 548 brake horsepower each, at 1150 revolutions per minute, Sterling Viking II gasoline engines, built by the Sterling Engine Co. Four of these engines are each connected to one Westinghouse, 340 kilowatts, 250 volts, 1150 r.p.m. direct current generator. One of these engines is direct connected to one Westinghouse 340 kilowatts, double armature, 125 volts at 1150 r.p.m. direct current generator. There are three exciters, each 29 kilowatts, 125 volts, 1150 revolutions per minute.

Two Westinghouse main propelling motors, each of 1065 horsepower at 625 volts, 425 revolutions per minute, direct current.

Auxiliary Generators—Two, 10 kilowatts each, driven by 6-cylinder Winton diesel engines. Generators, Westinghouse.

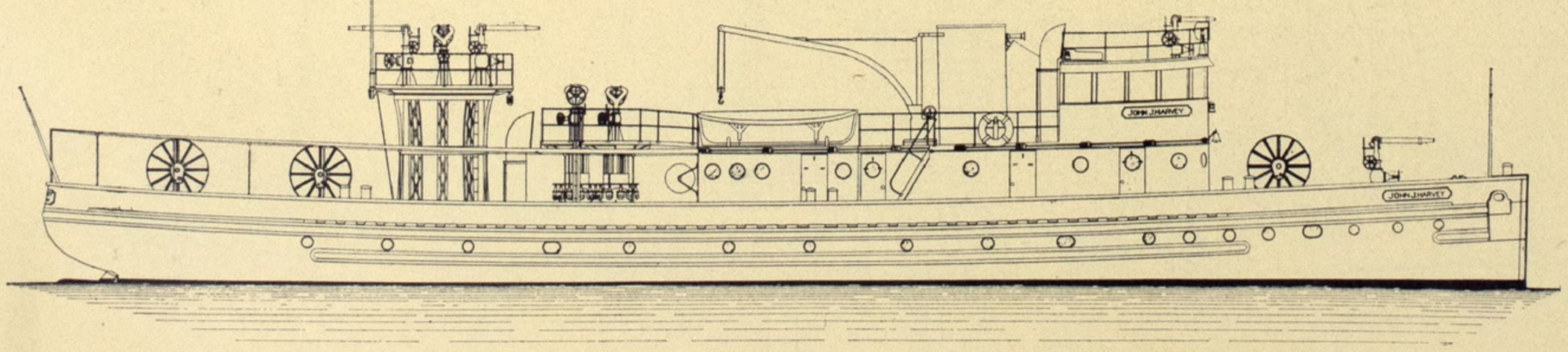
Boiler—One, Nelseco-Clarkson exhaust and oil fired heating boiler, made by the New London Ship & Engine Works of the Electric Boat Co.; 110 square feet heating surface; takes heat of exhaust from main engines and is also fitted with Todd oil burner.

Auxiliaries—There are four main fire pumps, Lecourtenay 2-stage centrifugals with 12-inch suction and 10-inch discharge, each with a capacity of 4000 gallons per minute against 150 pounds; in series two pumps will give 4000 gallons per minute against 300 pounds. Other pumps for general service are, one Watreous rotary bilge; one Thomas sump pump and two Burke sanitary pumps. All pumps are driven by Westinghouse motors. A Foamite system can deliver 500 gallons per minute of foam at 100 pounds.

AUXILIARY EQUIPMENT

Motor Generator—10 K.W. Westinghouse
Air Compressors—2 Worthington
Oil Purifier—No. 20 Hydroil
Capstan-Windlass—American Engineering Co.
Steering Engine—Sperry Gyroscope Co.
Propellers—Columbian Bronze Corp.
Electric Motors—All Westinghouse Elec.
Refrigeration—General Electric Co.
Fire Protection—Aqua, CO_2 Systems; Alfite
Revolution Counters—Cummings Mach. Wks.
Signals, Telephones—Chas. Cory & Son
Marine Hardware—The Dayton Mfg. Co.
Radiators—Erskine Copper Radiator Corp.
Outboard Bearings—B. F. Goodrich Rubber
Windows—Kearfott Engineering Co.
Thrust Bearings—Kingsbury Mach. Works
Valves—The Lunkenheimer Co.
Deck Covering—Selby, Battersby & Co.

To facilitate fighting fires under piers and in shallow water, the vessel is equipped with a 14-foot all-steel motor driven lifeboat. This lifeboat is equipped with a 15 horsepower gasoline engine, with reversing gear, for propulsion.



MARK TWAIN—River Towboat—Stern Wheel—Steam

Name—Mark Twain
Owner—Inland Waterways Corp.
Builder—Howard Ship Yards & Dock Co.
Naval Architect—Inland Waterways Corp.
Launched—Aug. 29, '31; comp., Feb. 8, '32
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 196 feet; length between perpendiculars, 160 feet; breadth molded, 42 feet; depth molded, 6 feet; draft, 4 feet; gross tonnage, 513; net tonnage, 476; bunker fuel capacity in tons, 110; speed, about 10 miles.

MACHINERY PARTICULARS

Main Engines—Two, tandem compound condensing, built by Marietta Mfg. Co. Size, 17 x 34 inches and 9 feet; horsepower 500 each at from 20 to 25 revolutions per minute.

Boilers—Two, Babcock & Wilcox watertube marine boilers with a total heating surface of 4132 square feet and 272 square feet of superheating surface. Working pressure, 300 pounds per square inch; 150 degrees Fahr. superheat; fuel, oil. Superheaters, oil burning equipment and furnace brick supplied by Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty

Auxiliary Generators, Exciters—(turbine) Westinghouse

AUXILIARY EQUIPMENT

Pumps—Worthington Pump & Mach. Corp.
Capstans—Three, One by American Machine & Eng. Corp.; two, Iowa Machine Works
Steering Engine—American Engineering Co.
Refrigeration—Lipman Mfg. Co.
Main Condenser—Worthington Pump & Mach.
Anchors—Baldt Anchor Chain & F. Corp.
Marine Hardware—The Dayton Mfg. Co.

DESCRIPTION

The Inland Waterways Corp. is doing a valuable work in developing the most practical and efficient modern river craft. In the Mark Twain full rein has been given in the improvement of steam conditions for a tandem compound condensing type of steam engine with high pressure steam and superheat. The vessel is of steel construction throughout

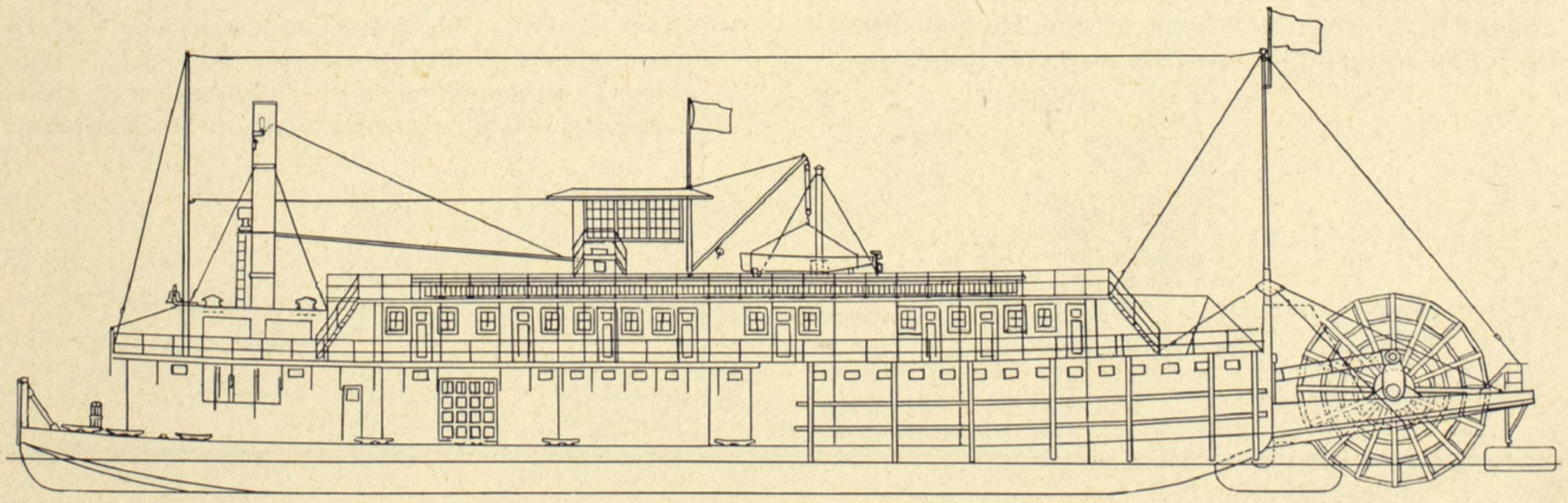
In the design of this vessel, while holding to the general features which have proved satisfactory in years of practical experience with river navigation, many hitherto unheard of innovations have been applied. It is not customary for instance on river craft to use the watertube marine type of boiler nor is it customary to use oil as fuel. It is still less customary to go to such high pressures as 300 pounds per square inch and 150 degrees superheat.

This vessel represents therefore the results of a deliberate engineering study with the view of making use of modern developments in every possible practical way in this powerful river craft. Among other things for instance is the turbine driven hydraulic steering gear for handling the three main rudders and two monkey rudders.

The pumping equipment on this vessel would do credit to a large cargo vessel and consists of main condenser circulating; main steam air ejector; backwash filter; fresh water; fire; portable oil; filter supply; fuel transfer; and boiler feed, all supplied by Worthington Pump & Machinery Corp. There is a separate condensing plant, water still, water filter and softening plant, and refrigerating equipment.

The cabin and pilot house is of wood construction and has accommodations for a crew of 26.

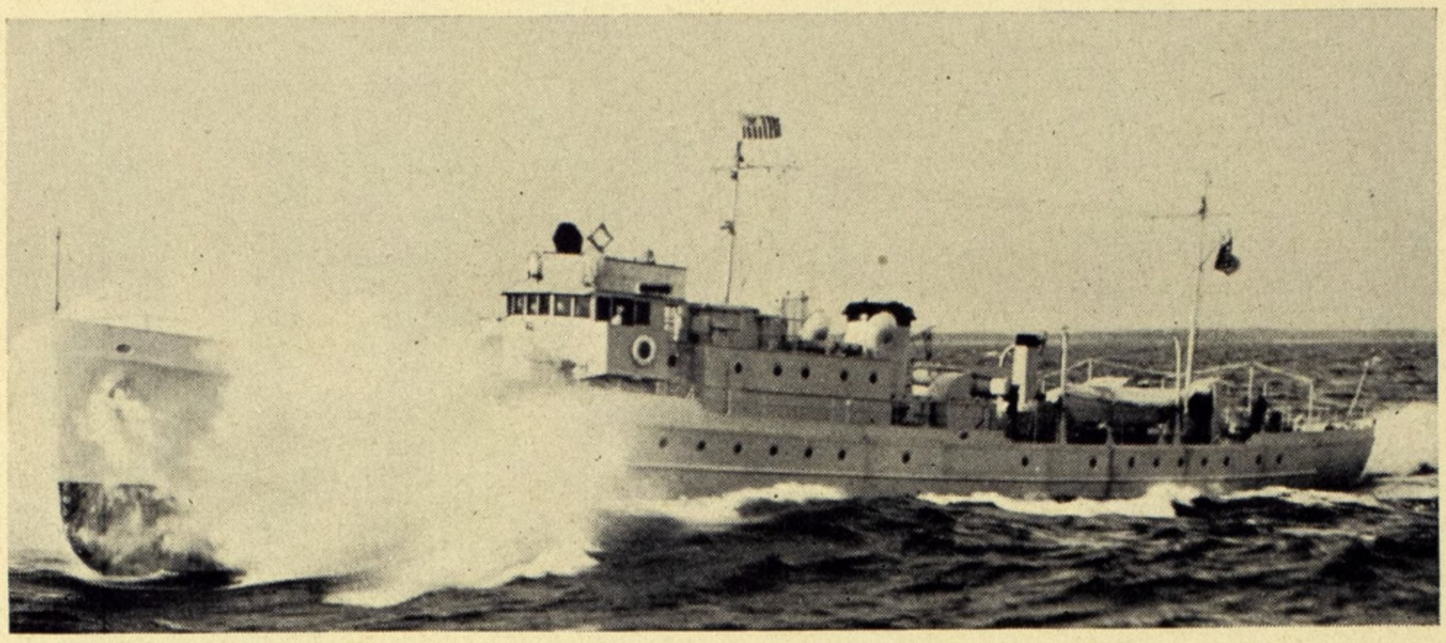
Each of the two tandem compound condensing steam engines are connected to cranks of the sternwheel by pitmans. The sternwheel is 24 feet in diameter, 25 feet wide; 16 paddles.



THETIS AND CLASS—Coast Guard Patrol—Twin Screw—Diesel

DESCRIPTION

First of a group of seven modern, high speed, twin screw, diesel, off-shore patrol boats, designed especially for the work of enforcing laws against smuggling. Equipped with twin rudders, these vessels are excellent sea boats, maneuver readily and turn quickly. Sea trials demonstrated their steadiness and lack of vibration.



Name—THETIS
Owner—United States Coast Guard
Builder—Bath Iron Works Corp.
Naval Architect—United States Coast Guard
Launched—Nov. 9, '31; comp., Nov. 27, '31
Sister Ships — AURORA, CALYPSO, DAPHNE, HERMES, ICARUS and PERSEUS. The scheduled delivery for final vessel is April 27, 1932.
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 165 feet; length between perpendiculars, 160 feet 9 inches; breadth molded, at waterline, 24 feet 1 inch; breadth molded at main deck, 25 feet 3¾ inches; depth molded, 13 feet 2½ inches; maximum draft, 9 feet; mean draft, 7 feet 6 inches; displacement loaded, 332 tons; bunker fuel capacity, in tons, 26.7; cruising radius, about 2500 miles; service speed, 16½ knots.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder, 4-cycle, airless injection, reversing diesel engines built by the Winton Engine Corp. Size, 14-inch bore, 16-inch stroke; 670 brake horsepower each at 450 revolutions per minute.

Auxiliary Power—Two, 15 k.w. Westinghouse generators, each direct connected to a 3-cylinder, airless injection Winton diesel engine. One 5 k.w. Westinghouse generator direct connected to a 2-cylinder, airless injection Winton diesel engine and through a clutch to a Worthington 2-stage air compressor. One emergency 5 k.w. gasoline driven generating set furnished by the Universal Engine Co.

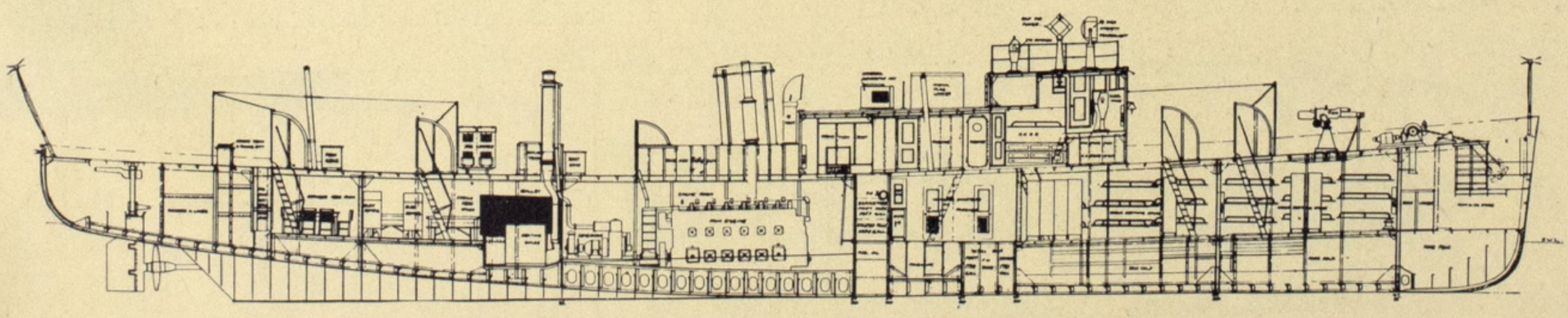
AUXILIARY EQUIPMENT

Pumps—Warren; Winton; Viking
Air Compressors—Worthington; Ingersoll-Rand; National Brake & Electric Co.
Windlass—Hyde Windlass Co.
Steering Gear—Sperry Gyroscope Co.
Propellers—Hyde Windlass Co.
Blowers—American Blower Corp.
Oil Coolers—Schutte-Koerting & Co.
Oil Purifier—Hydroil Corp.
Whistle—Allan Cunningham
Horn—(Pneuphonic) and SV type compressor, Westinghouse Air Brake Co.
Boiler (heating)—American Radiator Co.
Radiators (copper)—McQuay Radiator Corp.
Refrigerating Equipment—Westinghouse
Anchors, Chain—Baldt Anchor, Chain & F. Corp.
Searchlights—Sperry Gyroscope Co.
Windows—Kearfott Engineering Co.
Galley Range—Ingle Mfg. Co.
Marine Hardware—The Dayton Mfg. Co.
Electric Motors—Diehl Mfg. Co.
Stern Bearings—B. F. Goodrich Rubber Co.
Thrust Bearings—Kingsbury Machine Works
Lifeboats, Davits—Welin Davit & Boat Corp.

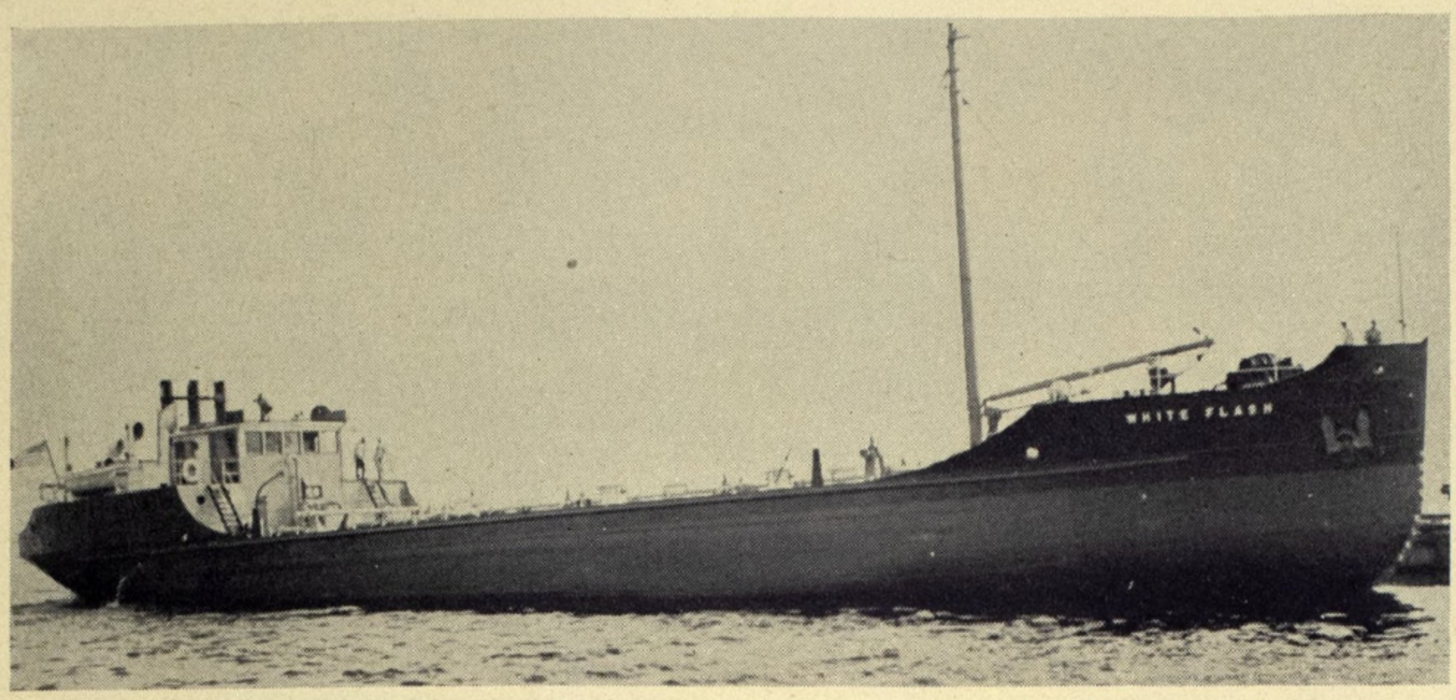
Unusually comfortable quarters are provided for officers and crew.

Machinery arrangement in the engine room has been very carefully laid out to give maximum accessibility and convenience in operation.

Contract for all seven of these vessels was awarded the Bath Iron Works Corp., Jan. 9, 1931 at a cost of $195,000 each. The bid of the Bath Iron Works was the lowest of thirteen.



WHITE FLASH—Tanker—Coastwise—Single Screw—Diesel Electric



Name—WHITE FLASH
Owner—Atlantic Refining Co.
Builder—Sun Shipbuilding & Dry Dock Co.
Naval Architect—Atlantic Refining Co.
Launched—Sept. 10, '31; comp., Sept. 16, '31
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 201 feet 2 inches; length between perpendiculars, 190 feet; breadth molded, 34 feet; depth molded, 12 feet; draft, 9 feet 6 inches; displacement loaded, 1330 tons; gross tonnage, 616; net tonnage, 366; cargo capacity, 1000 tons, and in cubic feet, 43,000; bunker diesel fuel capacity in tons, 38; speed, in service, 9 knots.

MACHINERY PARTICULARS

Main Engines—Three, Cooper Bessemer, 4-cycle, 6-cylinder, diesel engines. Size, 7½ by 10½ inches; each 165 horsepower at 550 revolutions per minute, direct connected to a generator.

Main Generators—Three, General Electric, each of 105 kilowatts, 125 volts, each direct connected to one of the 165 horsepower diesel engines described above. Two exciters of 25 kilowatts capacity each, 120 volts, attached to each one of the two main generators.

Propelling Motor—One, General Electric, rated at 375 horsepower, at 150 revolutions per minute, 375 volts.

DESCRIPTION

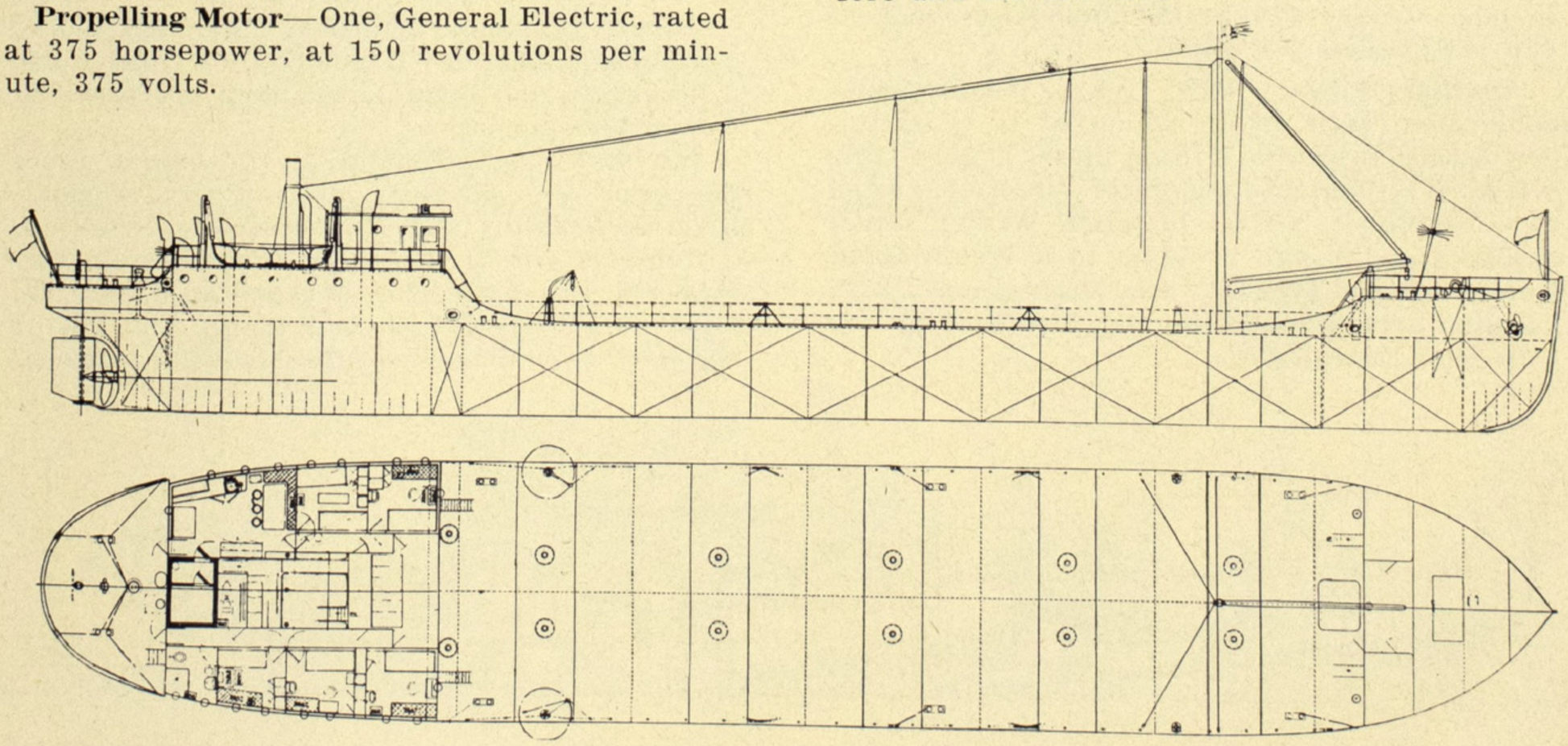
Complete all welded vessel, built on the longitudinal framing system for coastwise service for the carriage of liquid cargo. There are nine athwartship bulkheads and one centerline oil tight bulkhead extending from the forward engine room bulkhead at the after end of the vessel to the after bulkhead of the dry cargohold in the forward end.

AUXILIARY EQUIPMENT

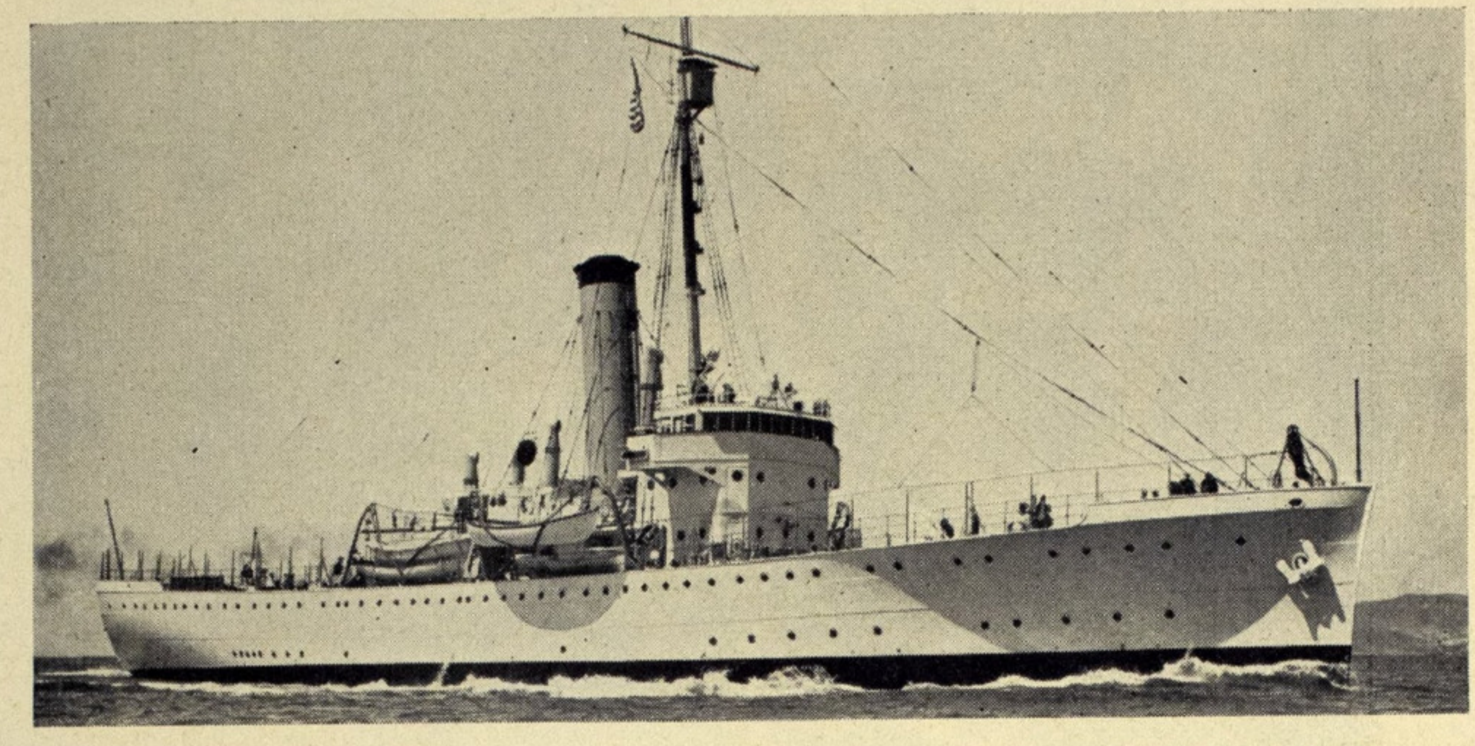
Pumps—Northern Pump Co.
Windlass—Hyde Windlass Co.
Capstan—Hyde Windlass Co.
Steering Engine—Hyde Windlass Co.
Refrigeration—Brunswick-Kroeschell Co.
Electric Motors—(11) General Electric
Anchors, Chain—Baldt Anchor Chain
Searchlight—Sperry Gyroscope Co.

Among the electric motors used on board the one for the cargo oil pump has a rating of 60 horsepower at 1750 revolutions per minute and 115 volts; the fire and bilge pump motor is 25 horsepower at 1140 revolutions per minute and 115 volts; the anchor windlass motor is 15 horsepower at 650 revolutions per minute at 115 volts; the remaining eight motors vary from 1 horsepower to 10 horsepower.

The dry cargohold located directly aft of the fore peak extends across the vessel and for 19 feet 6 inches fore and aft to the forward bulkhead of oil tank No. 1. There are five oil tanks, each divided into two parts by a centerline bulkhead. The after bulkhead of tank No. 5 is the forward bulkhead of the fuel oil bunker tank, which extends across the ship, divided by a centerline bulkhead and for four feet in a fore and aft direction.



CAYUGA—Coast Guard Cutter—Single Screw—Turbo-Electric



Saranac—sistership of the Cayuga

DESCRIPTION

This is the last of ten cutters authorized by congress in 1926. The first five, CHELAN class, were built at the Fore River plant of the Bethlehem Shipbuilding Corp. Four, ITASCA class, were built by the General Engineering & Dry Dock Co. All ten ships are identical in hull particulars, but differ slightly in interior arrangements and interior details.

Name—CAYUGA
Owner—United States Coast Guard
Builder—United Dry Docks, Staten Island
Naval Architect—United States Coast Guard
Launched—Oct. 7, '31; comp., March 5, '32

HULL PARTICULARS

Length over all, 250 feet; length between perpendiculars, 236 feet; breadth molded, 42 feet; depth molded, 26 feet 10 inches; draft, 15 feet; displacement loaded, 2000 tons; bunker fuel oil capacity, 90,000 gallons; cruising radius, 8000 miles; service speed, 16 knots.

MACHINERY PARTICULARS

Main Engine—One, steam turbine direct connected to an a. c. generator. A synchronous motor direct connected to the propeller shaft. The turbine is of the impulse reaction type, operating with steam at 260 pounds pressure and 175 degrees superheat and exhausing at 28½ inches vacuum. At full speed of 3600 revolutions per minute, the generator will develop 3220 horsepower at the motor. The turbine, generator and motor were designed and built by Westinghouse Electric & Mfg. Co.

Boilers—Two, Babcock & Wilcox watertube marine boilers with a total heating surface of 6336 square feet and total superheating surface of 696 square feet; working pressure, 265 pounds per square inch; 175 degrees Fahr. superheat; fuel, oil. Superheaters, oil burning equipment and feed water regulators all supplied by Babcock & Wilcox Co. Soot Blowers—Diamond Power Specialty Corp.

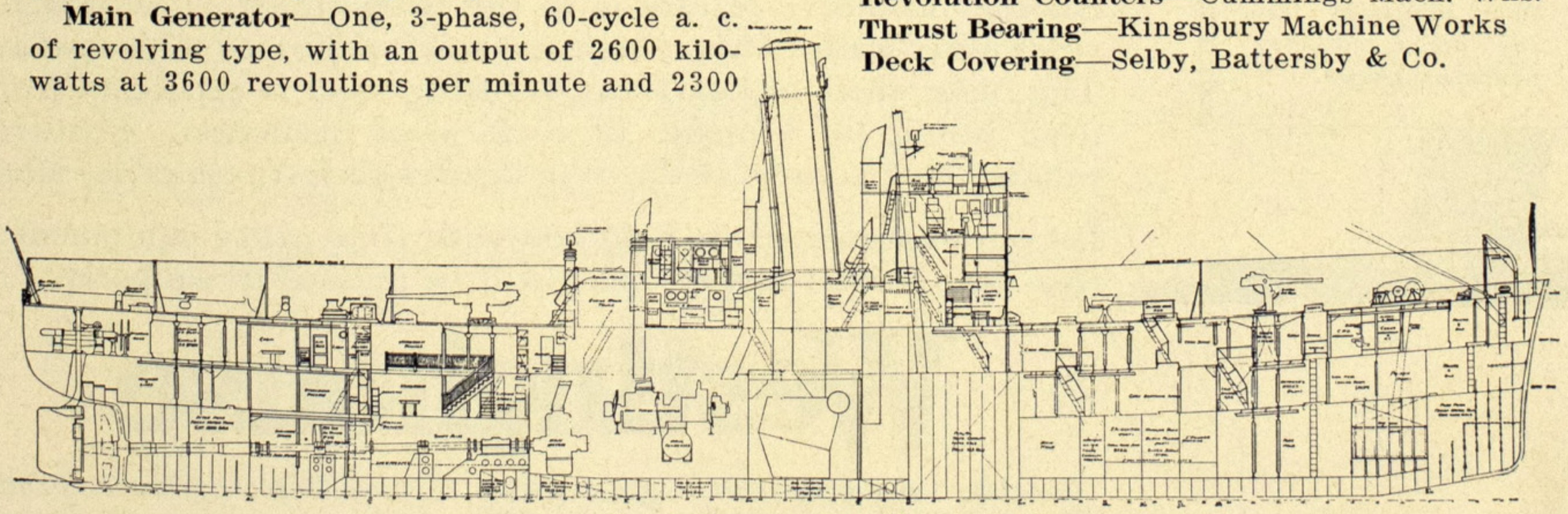
Main Generator—One, 3-phase, 60-cycle a. c. of revolving type, with an output of 2600 kilowatts at 3600 revolutions per minute and 2300 volts, direct connected to the turbine.

Main Motor—One, Westinghouse, 3220 shaft horsepower, revolving field, salient pole, synchronous type, 3-phase, 44 poles, 60-cycle, at 163.5 revolutions per minute, direct connected to the propeller shaft.

Auxiliary Power—Electric current for auxiliary power, excitation, and lighting furnished by four Westinghouse generating sets; three turbine driven and one driven by an a. c. induction motor. One of the turbine driven generating sets is a 62½ k. v. a. alternating current generator set for auxiliary power in port. Each of the other turbine driven sets consists of a turbine driving a 187½ k. v. a. 240-vole alternating current generator for auxiliary power and a 3-wire, 120-240 volt direct current generator, all on the same shaft. The direct current generator

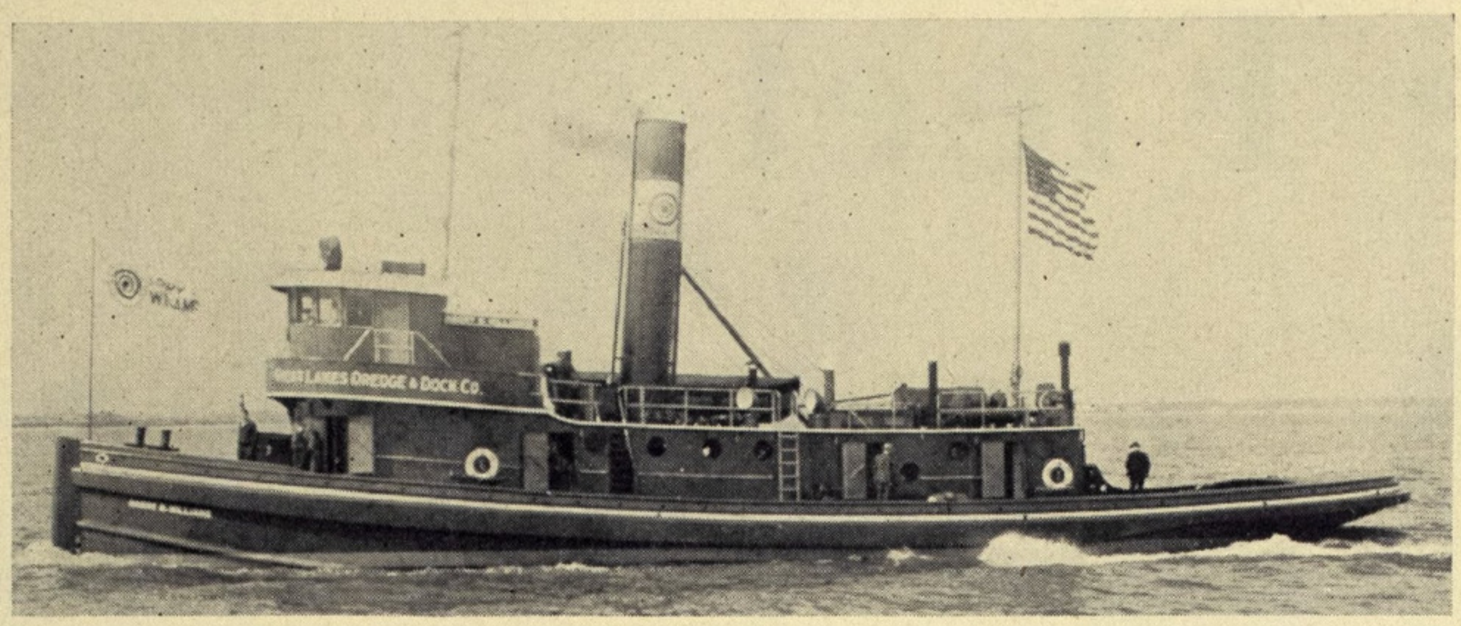
AUXILIARY EQUIPMENT

Pumps—Warren; Quimby
Windlass—American Engineering Co.
Capstan—American Engineering Co.
Steering Gear—American Engineering Co.
Propeller—Cramp Brass & Iron Foundries
Induced Draft Fan—B. F. Sturtevant Co.
Anchors—General Steel Castings Corp.
Oil Purifier—De Laval Separator Co.
Valves and Fittings—Powell
Gyro Compass—Sperry Gyroscope Co.
Searchlights—Sperry Gyroscope Co.
Windows—Kearfott Engineering Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Revolution Counters—Cummings Mach. Wks.
Thrust Bearing—Kingsbury Machine Works
Deck Covering—Selby, Battersby & Co.



Inboard profile of Saranac, sistership of the Cayuga

HARRY B. WILLIAMS—Tug—Lakes—Single Screw—Turbine



Name—HARRY B. WILLIAMS
Owner—Great Lakes Dredge & Dock Co.
Builder—Manitowoc Ship Building Corp.
Naval Architect—Great Lakes D. & D. Co.
Launched—Mar. 21, '31; comp., June 3, '31
Classification—Owner's requirements and to meet United States steamboat inspection for ocean service

HULL PARTICULARS

Length over all, 116 feet 2 inches; length between perpendiculars, 102 feet 6 inches; breadth molded, 26 feet; depth molded, 15 feet; draft, 13 feet 6 inches; displacement loaded, 610 tons; gross tonnage, 263; net tonnage, 104; bunker fuel capacity, in tons, 140, and in gallons, 35,000.

MACHINERY PARTICULARS

Main Engine—One, steam turbine unit with double reduction gears, built by Westinghouse Electric & Mfg. Co. A two-stage turbine with 100 per cent astern power; one high pressure ahead, one low pressure ahead, and one low pressure astern. Shaft horsepower, 850; propeller revolutions per minute, 125. Turbine revolutions per minute, 6000.

Boiler—One, Babcock & Wilcox watertube marine boiler with 3000 square feet of heating surface and 531 square feet of superheating surface; working pressure, 320 pounds; 200 degrees Fahr. superheat; fuel, oil. Superheater, de-superheater and oil burning equipment all supplied by the Babcock & Wilcox Co. Soot Blowers—Diamond Power Specialty Corp.

Aux. Gen.—One, Westinghouse turbine set.

DESCRIPTION

The first turbine driven tug to be built in the United States and probably in the world. Also the first geared turbine installation on the Great Lakes, anticipating the Ford canalers described elsewhere in this issue. Other unusual features are: The propelling machinery is the first of its type and gives 100% astern power.

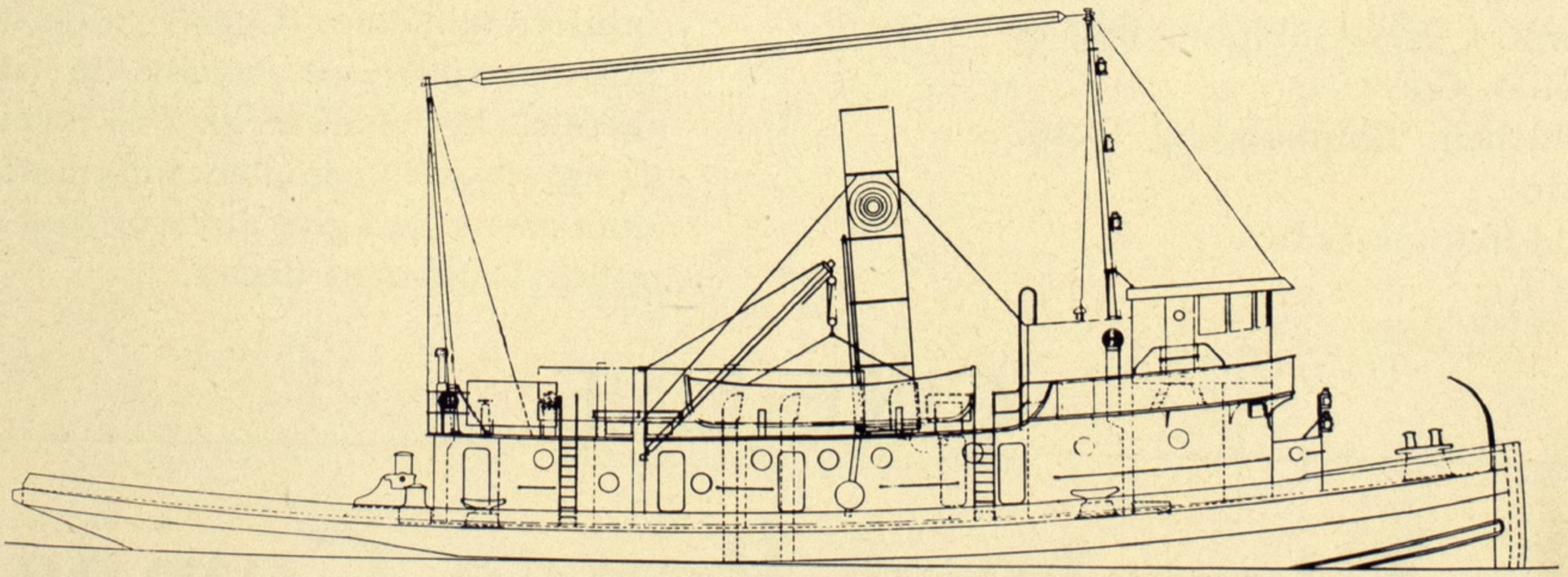
AUXILIARY EQUIPMENT

Pumps—Warren, Westinghouse
Windlass—American Engineering Co.
Steering Engine—American Engineering Co.
Refrigeration—Frigidaire
Main Condenser—Westinghouse
Forced Draft Blower—Westinghouse
Feed Water Heater—Westinghouse
Turbine Drive—For circulating and condensate pumps; for hydraulic steering gear, Westinghouse
Oil Purifier—The Sharples Specialty Co.
Towing Machine—American Engineering Co.
Steam Gypsey—American Engineering Co.
Stern Bearing—B. F. Goodrich Rubber Co.
Thrust Bearing—Kingsbury Machine Works

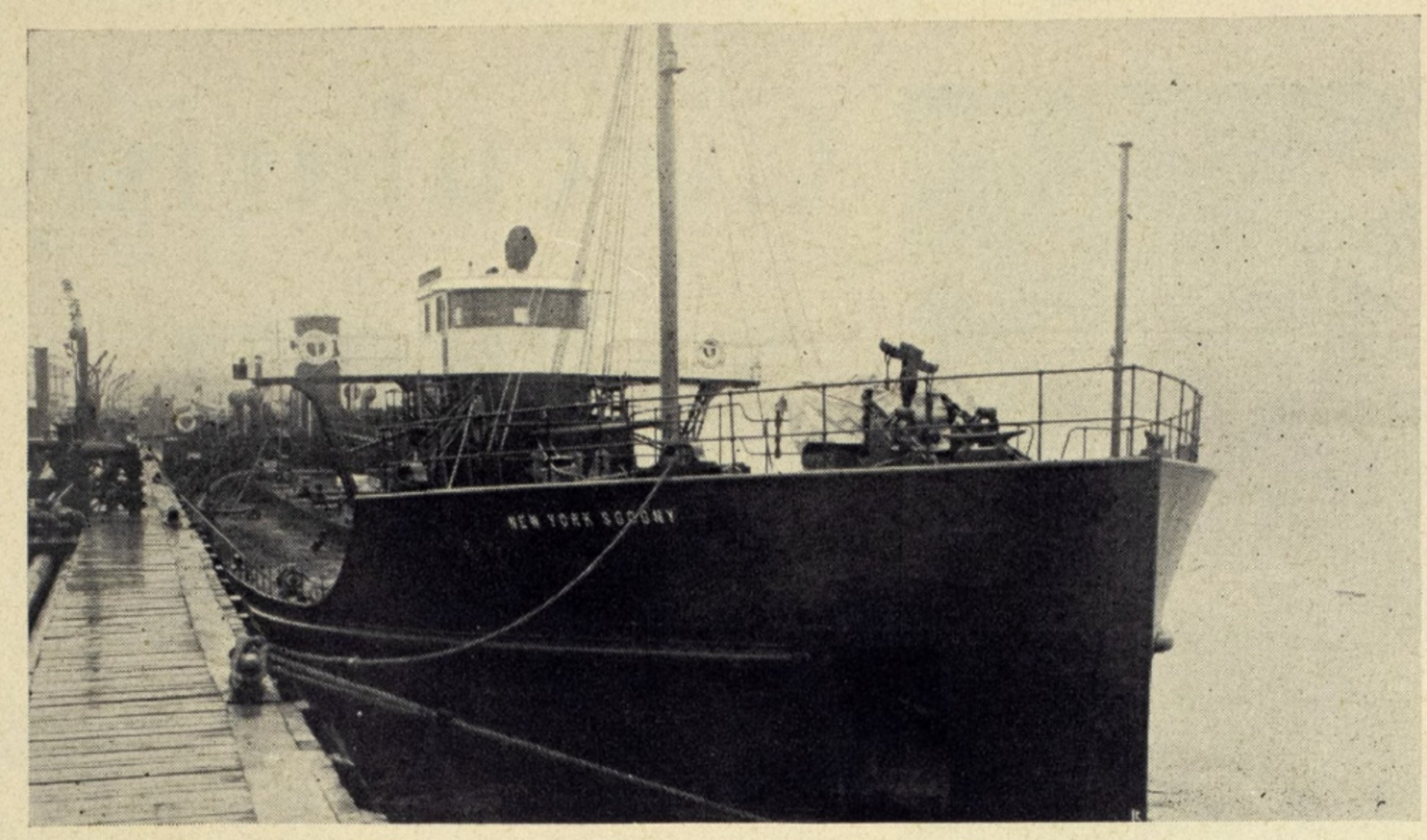
In this powerful steel tug, built to full ocean requirements, the Great Lakes Dredge & Dock Co. through its chief engineer and vice president, A. Neveling has incorporated the most modern developments of marine engineering. Advantage has been taken of recent progress in the propelling unit.

By having 100 per cent power astern the usual objection to turbines in this respect has been overcome. To insure readiness for service on short notice, there is an auxiliary steam generator which burns kerosene and provides steam up to 125 pounds which is sufficient to get the main unit quickly into operation.

At 285 pounds steam, 200 degrees superheat and 28-inch vacuum, the propelling unit will use 11.9 pounds of steam per horsepower per hour at 850 shaft horsepower.



NEW YORK SOCONY—Tanker—Coast—Twin Screw—Diesel



DESCRIPTION

This twin screw diesel tanker, equipped and fitted for ocean service, was built to the owner's designs for trading on the New England coast and tributary waters. She has twin rudders and a capacity of 15,000 barrels. With two engines developing over 375 horsepower each at 265 revolutions per minute, her speed is approximately 9 knots.

Name—NEW YORK SOCONY
Owner—Standard-Vacuum Transportation Co.
Builder—Bethlehem S. B. Corp., Baltimore
Naval Architect—N. J. Pluymert
Launched—Nov. 5, '31; completed Jan. 15, '32
Classification—Owner's requirements.

HULL PARTICULARS

Length over all, 263 feet 2 inches; length between perpendiculars, 262 feet; breadth molded, 45 feet 6 inches; depth molded, 15 feet 6 inches; draft molded, 12 feet 3 inches; displacement loaded, 3143 tons; gross tonnage, 1539; net tonnage, 932; cargo capacity, 750,000 gallons and in cubic feet, 100,260; bunker diesel fuel capacity, 53.2 tons at 38.5 cubic feet; speed at sea, 8.8 knots.

MACHINERY PARTICULARS

Main Engines—Two, McIntosh & Seymour, 6-cylinder, 4-cycle, direct reversible, air injection diesel engines. Size, 13-inch bore by 18-inch stroke. Total horsepower in both engines, 700 at 265 revolutions per minute.

Auxiliary Generators—Three, diesel engine direct drive. Two 80-horsepower, one 60-horsepower. Winton engines and Diehl Mfg. Co. generators.

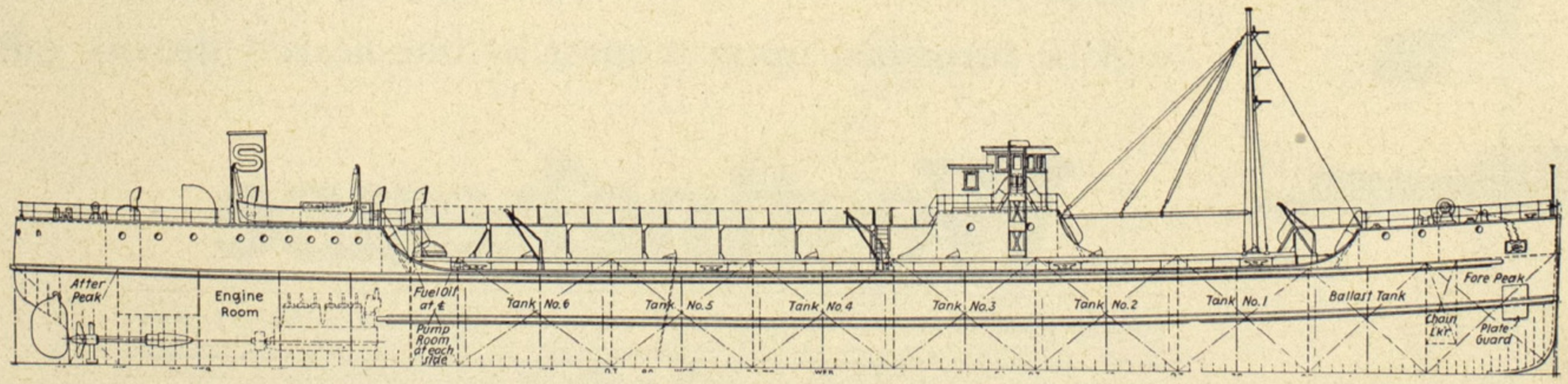
AUXILIARY EQUIPMENT

Pumps—Northern Pump Co.; Nash
Windlass—American Engineering Co.
Capstan—American Engineering Co.
Steering Engine—American Engineering Co.
Anchors, Anchor Chain—Baldt
Propellers—Bethlehem Shipbuilding Corp.
Refrigeration—Frigidaire Sales Corp.
Electric Motors—Diehl Mfg. Co.
Compressor-Generating Set—15 H. P. Hill Diesel; Diehl Generator
Compressor—Worthington
Oil Purifier—The Sharples Specialty Co.
Blower—B. F. Sturtevant Co.
Electrical Controls—Cutler-Hammer Inc.
Galley Equipment—Edison G. E. Appliance
Storage Batteries—Edison Storage Bat. Co.
Lifeboats, Davits—Welin Davit & Boat Corp.

The vessel is divided into six tanks for cargo, forward of which is a spare tank, which may be used for ballast or special fluid cargo as it has its own pump and loading system. The motor for this pump is situated under the forecastle, the drive being through a vertical spindle.

A fore and aft bridge is constructed between the forecastle and center house and from this point to the poop.

Space under midship house and on top of expansion trunk protected by a steel enclosure serves as storage for the steel bottles of the Lux CO_2 fire extinguishing system which is connected up with all cargo tanks, pump rooms and fuel bunkers.



RICHMOND—Tug—Harbors—Single Screw—Steam

Name—RICHMOND
Owner—Chesapeake & Ohio Railway Co.
Builder—The Pusey and Jones Corp.
Naval Architect—W. T. Newell
Launched—May 5, '31; comp., July 29, '31
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 109 feet; length between perpendiculars, 102 feet 6 inches; breadth molded, 28 feet; depth molded, 14 feet 6 inches; draft mean, 12 feet 2½ inches; displacement loaded, 505 tons in fresh water; gross tonnage, 266.79; net tonnage, 132; bunker fuel capacity in tons of coal, 85; speed, 14 miles per hour.

MACHINERY PARTICULARS

Main Engine—One, compound inverted, built by The Pusey and Jones Corp. Size, 20-44 inches by 30 inches stroke; 1000 horsepower at 100 revolutions per minute. A 4-bladed, solid type semisteel propeller is used, 10 feet in diameter and 11 feet 6 inches in pitch.

Boiler—One, scotch marine type, built by Newport News Shipbuilding & Dry Dock Co. Size, 16 feet diameter x 12 feet long; working pressure, 170 pounds per square inch. Fuel, coal, hand fired. The boiler has 3200 square feet of heating surface and 96 square feet of grate surface; and four 48-inch diameter furnaces, each 8 feet 7⅝ inches long and with two combustion chambers.

Soot Blowers—Diamond Power Specialty Corp.
Auxiliary Generators—Two Westinghouse turbine generators, each of 7½ kilowatts

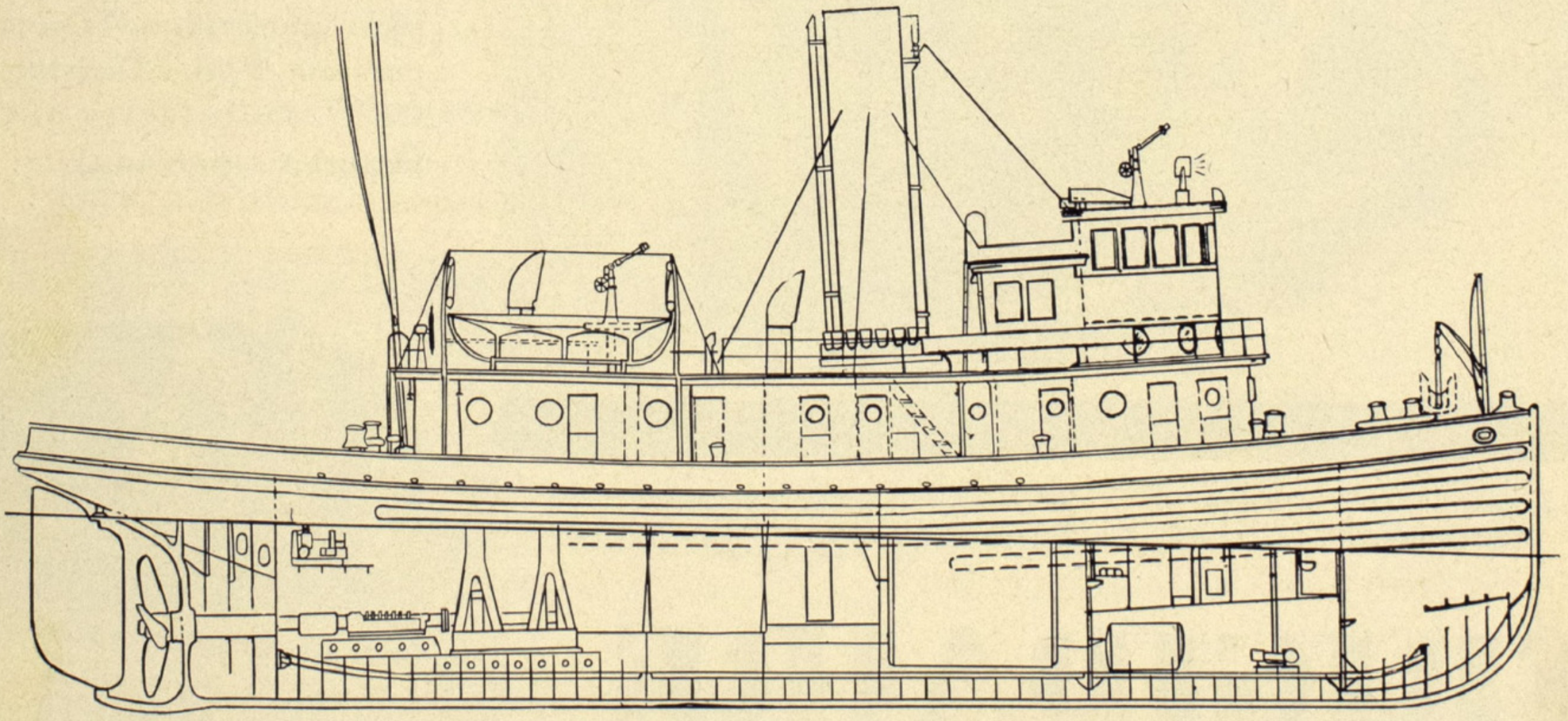
AUXILIARY EQUIPMENT

Pumps—Worthington Pump & Mach. Corp.
Gypseys—(Two) Hyde Windlass Co.
Steering Engine—Hyde Windlass Co.
Propellers—The Pusey and Jones Corp.
Feed Water Heater—Davis Engineering Corp.
Searchlight—Sperry Gyroscope Co.
Circulating Pump—Newport News S. B.
Valves—Crane Co.
Anchors—Baldt Anchor Chain & Forge Corp.
Deck Covering—Selby, Battersby & Co.
Safety Valves—Hancock-Ashcroft
Reducing Valves—Leslie, Gold

In addition to her service as a powerful tug, the RICHMOND is also equipped for fire fighting. The fire pump has a capacity of 2000 gallons per minute at 100 pounds per square inch nozzle pressure. Invincible fire monitors with 1¾, 1½ and 1¼ inches tip sizes are located, one on top of the pilot house and one on the raised platform aft. There are several hose connections on each side of the main deck house and also one at each end of the main deck house.

DESCRIPTION

A powerful steel tug for the Chesapeake and Ohio Railroad for use in shifting lighters, carfloats and barges and to handle ships at the railroad's terminal at Newport News, Va. The hull is built of steel on the transverse system with heavy framing and shell plating. Three watertight bulkheads divide the hull into four compartments. Coal is used as fuel.



Merchant Type Steel Vessels Over 100 Tons Under Construction in American Shipyards During 1931

Vessels Completed, Alphabetically Arranged

Vessel	Yard	Type	Class	Gross	Owners	Mach.	H.P.	Len. ft. in.	Beam ft. in.	Dep. ft. in.	Fuel	Remarks	Status
Aurora	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Borinquen	Fore River, Beth. S. B. Co.	Pass.	Ocean	7114	Coamo Steamship Co.	Turbine	6420	429	59 6	35	Oil	N. Y., Porto Rico, San Domingo	Completed
Cayuga	United D. D. S. I. Plant	Cutter	Ocean	2000*	U. S. Coast Guard	Turb. Elec.	3220	250	42	26 10	Oil	Coast Guard Service	Completed
Chester	Great Lakes Eng. Works	Cargo	Coast	1819	Ford Motor Co.	Turbine	1600	300	43	20	Oil	Lakes—Barge Canal	Completed
C. H. Spedden	Pusey & Jones Corp.	Tug	Harbor	214	Donaldson Tow. & L. Co.	Recip.	550	105	23	15 2	Oil	General Towing	Completed
City of Milwaukee	Manitowoc S. B. Corp.	Carferry	Lakes	2942	Grand Trunk Ry. Co.	Recip.	2700	360	56	21 6	Coal	Twin Screw, Single Ended	Completed
City of Sanford	Jacksonville, Fla	Frt.	Rivers	349	St. Johns River Line Co.	Oil Eng.	360	133	25 6	..	Oil	Between Jacksonville & Sanford	Completed
Columbine	Moore Dry Dock Co.	Tender	Ocean	320*	U. S. Bureau Lighthouse	Oil Elec.	240	121 4	25	9	Oil	Speed—9½ knots	Completed
Daylight	Sun S. B. & D. D. Co.	Tanker	Ocean	9180	Standard Trans. Co.	Oil Eng.	2800	500 1½	65 9	37	Oil	Oil Tanker—Ocean Service	Completed
Duplex	Nashville Bridge Co.	Dredge	Rivers	400	Sternberg Dredging Co.	Oil Eng.	2750	150	50	7 10	Oil	Rivers and Canals	Completed
Edgewater	Great Lakes Eng. Works	Cargo	Coast	1819	Ford Motor Co.	Turbine	1600	300	43	20	Oil	Lakes—Barge Canal	Completed
Ellen Bushey	Ira S. Bushey & Sons	Tanker	Harbor	282	Ellen Bushey Inc.	Oil Eng.	240	120	24	10	Oil	Sound and Coastwise	Completed
Exeter	New York S. B. Co.	Pass.	Ocean	9360	Export Steamship Corp.	Turbine	8695	475 4	61 6	42 3	Oil	New York—Mediterranean	Completed
Excambion	New York S. B. Co.	Pass.	Ocean	9360	Export Steamship Corp.	Turbine	8695	475 4	61 6	42 3	Oil	New York—Mediterranean	Completed
Exochorda	New York S. B. Co.	Pass.	Ocean	9359	Export Steamship Corp.	Turbine	8695	475 4	61 6	42 3	Oil	New York—Mediterranean	Completed
Florida	Newport News S. B. Co.	Pass.	Ocean	4923	Peninsular & O. S. S. Co.	Turbine	9350	386 6	56 6	28 6	Oil	Caribbean Service	Completed
General Sumner	Fore River, Beth. S. B. Co.	Ferry	Harbor	780	City of Boston	Recip.	1100	174 4	40 8	16 10	Coal	Boston Harbor	Completed
Gulfmist	Gibbs Gas Engine Co.	Tanker	Rivers	227	Gulf Refining Co.	Oil Elec.	400	130	32	11	Oil	Stern Wheel Tanker	Completed
Gulfport	Nashville Bridge Co.	Dredge	Rivers	200	McWilliams Dredging Co.	Oil Eng.	835	134 6	30	8	Oil	Mississippi River Service	Completed
Harmony	Sp. Pt., Beth. S. B. Corp.	Tanker	Coast	918	Gulf Refining Co.	Oil Eng.	700	219	37	13 9	Oil	Coastwise Service	Completed
Harry B. Williams	Manitowoc S. B. Corp.	Tug	Lakes	264	Great Lakes D. & D. Co.	Turbine	850	116 2	26	15	Oil	General Towing	Completed
Harry F. Sinclair, Jr.	Fore River, Beth. S. B. Co.	Tanker	Ocean	6151	Sinclair Navigation Co.	Turbine	4000	435	57	32	Oil	Oil Tanker—Ocean Service	Completed
Henry A. Laughlin	Chas. Ward Eng. Works	T. Boat	Rivers	416	Vesta Coal Co.	Recip.	750	160	29 6	8 9	Coal	River Towing	Completed
Henry T. McCourt	Nashville Bridge Co.	Dredge	Rivers	300	Central Sand & Gravel Co.	Oil Eng.	240	150	36	6	Oil	Mississippi River Service	Completed
Herbert Hoover	Dubuque Boat & B. Co.	T. Boat	Rivers	1540	Inland Waterways Corp.	Oil Eng.	2200	215	43 6	10	Oil	Twin Screw Partial Tunnel	Completed
Hydrographer	Warwick Machine Co.	Survey	Ocean	750*	U. S. C. & Geodetic Survey	Oil Eng.	860	167 5	31 6	18 2	Oil	Begun by Spear Inc.	Completed
Illinois	Bath Iron Works	Trawler	Ocean	256	Red Diamond Trawl. Co.	Oil Eng.	550	132 4	24	13	Oil	Ocean Trawling	Completed
Jersey Shore	Pusey & Jones Corp.	Ferry	Rivers	603	Del.-N. J. Ferry Co.	Oil Eng.	925	206	58	15 6	Oil	Capacity—75 Autos	Completed
John J. Harvey	Todd S. B. & D. D. Co.	Fire Bt.	Harbors	268	City of New York	Gas	2740	130	26	7 6	Gas	Cost $582,500	Completed
Knickerbocker	United D. D. S. I. S. B. Plant	Ferry	Harbor	2045	City of New York	Recip.	4000	267	46	19 9	Oil	New York harbor service	Completed
Linden	Merrill Stevens D. D. Co.	Tender	Rivers	323*	U. S. Bureau Lighthouses	Oil Elec.	240	121 4	25	9	Oil	Light Station Main., Speed 9½ knots Com.	
Locust Point	Pusey & Jones Corp.	Tug	Harbor	222	Donaldson Tow. & L. Co.	Recip.	550	105	23	15 2	Oil	General Towing	Completed
L. P. Hosford	Albina Eng. & Mach. Works	Pass.	River	680	Harkins Transp. Co.	Oil Eng.	500	160	30	10 6	Oil	Bet. Astoria & Portland, Ore.	Completed
Maine	Bath Iron Works	Trawler	Ocean	256	Red Diamond Trawl. Co.	Oil Eng.	550	132 4	24	13	Oil	Ocean Trawling	Completed
Mamo	Beth. S. B. Co. Union Plant	Tug	Ocean	332	Young Bros. Ltd., Honolulu	Oil Eng.	1500	129 2	28	12	Oil	Inter island Towing	Completed
Mariposa	Fore River, Beth. S. B. Co.	Pass.	Ocean	18017	Matson-Oceanic S. S. Co.	Turbine	22000	631 6	79	52 9	Oil	California-Australia	Completed
Mary Woods No. 2	Nashville Bridge Co.	T. Boat	Rivers	149	Woods Lumber Co.	Recip.	300	111	26	4 8	Oil	River Towing	Completed
Matthew J. Boyle	Lawley & Sons Corp.	Fire Bt.	Harbor	338	City of Boston	Recip.	1000	125	28 6	12 9	Oil	Massachusetts Bay	Completed
Mercury Sun	Sun S. B. & D. D. Co.	Tanker	Ocean	8893	Motor Tankship Corp.	Oil Eng.	2800	497 10	65 9	37	Oil	Oil Tanker—Ocean Service	Completed
Murray Hill	Todd Shipyards Corp.	Ferry	Harbor	593	City of New York	Recip.	650	151	37 6	15	Oil	Pass. & Vehicles	Completed
Northern Sun	Sun S. B. & D. D. Co.	Tanker	Ocean	8864	Motor Tankship Corp.	Oil Eng.	2800	497 10	65 9	37	Oil	Oil Tanker—Ocean Service	Completed
Number Seven	Syracuse, N. Y.	Lighter	Canal	210	Oswego	Recip.	100	...	..	..	Oil	Lighter, Barge Canal	Completed
President Coolidge	Newport News S. B. Co.	Pass.	Ocean	21936	Dollar Steamship Lines	Turb. Elec.	26500	654 3	81	52	Oil	Twin Screw—N. Y.-Orient	Completed
President Hoover	Newport News S. B. Co.	Pass.	Ocean	21936	Dollar Steamship Lines	Turb. Elec.	26500	654 3	81	52	Oil	Twin screw—N.Y.-Orient	Completed

Red Star	Midland Barge Co.	Cargo	Coast	684	Victor Lynn Trans. Co.	Oil Eng.	560	155	31 11	12 6	Oil	Coasting Service	Completed
Richmond	Pusey & Jones Corp.	Tug	Harbor	267	Chesapeake & O. R. R. Co.	Recip.	1000	109	28	14 6	Coal	Harbor Towing	Completed
R. H. Goode	Great Lakes Eng. Works	Tug	Lakes	187	Dunbar & Sullivan Dr. Co.	Recip.	750	102	24	15	Coal	Owner's Use—Towing	Completed
San Diego	Moore Dry Dock Co.	Ferry	Harbor	556	San Diego-Coronado Fer. Co.	Oil Elec.	1050	204	7½ 43 6	14 11	Oil	Passengers and Autos	Completed
Shoshone	General Engineering Co.	Cutter	Ocean	2000*	U. S. Coast Guard	Turb. Elec.	3220	250	42	26 10	Oil	In Coast Guard Service	Completed
Southern Sun	Sun S. B. & D. D. Co.	Tanker	Ocean	8893	Motor Tankship Corp.	Oil Eng.	2800	497	10 65 9	37	Oil	Oil Tanker—Ocean Service	Completed
Supreme	Beth. S. B. Co. Sp. Pt.	Tanker	Coast	918	Gulf Refining Co.	Oil Eng.	700	219	37	13 9	Oil	Coastwise Service	Completed
Talamanca	Newport News S. B. Co.	Pass.	Ocean	6963	United Mail S. S. Co.	Turb. Elec.	10500	446	9 60	34 9	Oil	Passenger & Freight	Completed
Thetis	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Washington Square	Todd Shipyards Corp.	Ferry	Harbor	593	City of New York	Recip.	650	151	37 6	15	Oil	Passengers & Vehicles	Completed
White Flash	Sun S. B. & D. D. Co.	Tanker	Harbor	615	Atlantic Refining Co.	Oil Elec.	495	201	2 34	12	Oil	Oil Tanker—Coastwise	Completed
V. L. Keegan	B'klyn, N. Y.	Tanker	Harbor	112	B'klyn, N. Y.	Oil Eng.	140	...	..	..	Oil	Harbor Service	Completed
Vesta	Chas. Ward Eng. Wks	T. Boat	Rivers	416	Vesta Coal Co.	Recip.	750	160	29 6	8 9	Coal	River Towing	Completed

Vessels Under Construction as of December 31, 1931, Alphabetically Arranged

Acadia	Newport News S. B. Co.	Pass.	Ocean	5500	Eastern Steamship Co.	Turbine	11400	402	9 61	29 9	Oil	Express Coastal Liner	Launch. 2/13/32
Antigua	Fore River, Beth. S. B. Co.	Pass.	Ocean	7000	United Mail S. S. Co.	Turb. Elec.	10500	447	8 60	34 9	Oil	Pass. & Fruit, Cent. Amer.	Launch. 12/12/31
Calypso	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Under con.
Capt. Meriwether Lewis	Marietta Mfg. Co.	Dredge	Rivers	1500	U. S. Engineers	Recip.	1500	268	11½ 50	8 6	Oil	Missouri & Miss. Rivers	Under con.
Capt. Thomas Clark	Marietta Mfg. Co.	Dredge	Rivers	1500	U. S. Engineers	Recip.	1500	268	11½ 50	8 6	Oil	Missouri & Miss. Rivers	Under con.
C. G. No. 55	Defoe B. & M. Works	Cutter	Ocean	1000	U. S. Coast Guard	Turbine	1500	165	36	21	Oil	For Use on Great Lakes	Under con.
Columbia	Newport News S. B. Co.	Pass.	Ocean	5400	Colombian S. S. Co.	Turbine	7500	404	3 57 6	31 6	Oil	Mail & Express Service	Under con.
Chiriqui	Newport News S. B. Co.	Pass.	Ocean	7000	United Mail S. S. Co.	Turb. Elec.	10500	446	9 60	34 9	Oil	Pass. & Freight	Launch. 11/14/31
Daphne	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Under con.
DeWitt Clinton	Ellicott Machine Corp.	Dredge	Harbor	500	U. S. Engineers	Recip.	750	182	3 36	9	Oil	20-inch Pipe Line Dredge	Under con.
Dundee	Dravo Contracting Co.	Dredge	Rivers	1450	U. S. Engineer Corps	Recip.	1000	224	44 4	7	Oil	Miss. River Chan. Dredging	Under con.
Hayti	Newport News S. B. Co.	Pass.	Ocean	5400	Colombian S. S. Co.	Turbine	7500	404	3 57 6	31 6	Oil	Mail & Express Service	Under con.
Hermes	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Under con.
Hull No. 146	Sun S. B. & D. D. Co.	Carferry	Ocean	8500	Seatrain Lines Inc.	Turbine	6600	478	63 6	38 3	Oil	Loaded Freight Cars	Contract
Hull No. 147	Sun S. B. & D. D. Co.	Carferry	Ocean	8500	Seatrain Lines Inc.	Turbine	6600	478	63 6	38 3	Oil	Loaded Freight Cars	Contract
Hull No. 406	New York S. B. Co.	Pass.	Ocean	30000	The U. S. Lines, Inc.	Turbine	30000	705	3 86	47	Oil	N. Y. to Channel Ports	Under con.
Icarus	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Under con.
Lilac	Hampton Roads S. B. Co.	Tender	Ocean	770*	U. S. Bureau Lighthouses	Recip.	1000	170	32	13	Oil	Lighthouse Tender	Under con.
Lurline	Fore River, Beth. S. B. Co.	Pass.	Ocean	18017	Matson-Oceanic S. S. Co.	Turbine	22000	631	6 79	52 9	Oil	California—Australia	Under con.
Manhattan	New York S. B. Co.	Pass.	Ocean	30000	The U. S. Lines Inc.	Turbine	30000	705	3 86	47	Oil	N. Y. to Channel Ports	Launch. 12/5/31
Mark Twain	Howard Shipyards Co.	T. Boat	Rivers	513	Inland Waterways Corp.	Recip.	1000	196	42	6	Oil	River Towing	Completed 2/8/32
Monterey	Fore River, Beth. S. B. Co.	Pass.	Ocean	18017	Matson-Oceanic S. S. Co.	Turbine	22000	631	6 79	52 9	Oil	California—Australia	Launch. 10/10/31
New York Socony	Beth. S. B. Corp., Sp. Pt.	Tanker	Coast	1539	Standard Transp. Co.	Oil Eng.	700	262	6 45 6	15 6	Oil	Coastwise Service	Completed 1/15/32
Ockerson	Dravo Contracting Co.	Dredge	Rivers	1800	U. S. Engineer Corps	Recip.	1600	214	46	9	Oil	Miss. River Chan. Dredging	Under con.
Pass Christian	Nashville Bridge Co.	Dredge	Rivers	300	McWilliams Dredging Co.	Oil Eng.	1400	140	36	9	Oil	Miss. River & Canal Service	Under con.
Perseus	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Under con.
Potter	Dravo Contracting Co.	Dredge	Rivers	1800	U. S. Engineer Corps	Recip.	1600	214	46	9	Oil	Miss. River Chan. Dredging	Under con.
Quirigua	Fore River, Beth. S. B. Co.	Pass.	Ocean	7000	United Mail S. S. Co.	Turb. Elec.	10500	447	8 60	34 9	Oil	Pass. & Fruit, Cent. Amer.	Launch 2/6/32
Saint John	Newport News S. B. Co.	Pass.	Ocean	5500	Eastern Steamship Co.	Turbine	11400	402	9 61	29 9	Oil	Express Coastal Liner	Launch. 1/9/32
San Cristobal†	Alabama D. D. & S. B. Co.	Dredge	Harbor	519	Anglo Mexican Pet. Co.	Turbine	750	132	38	9	Oil	Dredging—Mex. Rivers	Completed
Santa Elena	Federal S. B. & D. D. Co.	Pass.	Ocean	10500	Grace Steamship Co.	Turbine	12000	508	72	39	Oil	N.Y.-Cent. Amer. & San Fran.	Under con.
Santa Lucia	Federal S. B. & D. D. Co.	Pass.	Ocean	10500	Grace Steamship Co.	Turbine	12000	508	72	39	Oil	N. Y.-Cent. Amer. & San Fran.	Under con.
Santa Paula	Federal S. B. & D. D. Co.	Pass.	Ocean	10500	Panama Mail S. S. Co.	Turbine	12000	508	72	39	Oil	N. Y. & San Francisco	Launch April, 1932
Santa Rosa	Federal S. B. & D. D. Co.	Pass.	Ocean	10500	Panama Mail S. S. Co.	Turbine	12000	508	72	39	Oil	N. Y. & San Francisco	Launch. 2/24/32
Segovia	Newport News S. B. Co.	Pass.	Ocean	7000	United Mail S. S. Co.	Turb. Elec.	10500	446	9 60	34 9	Oil	Damaged by Fire	Launched 8/15/31
Veragua	Fore River, Beth. S. B. Co.	Pass.	Ocean	7000	United Mail S. S. Co.	Turb. Elec.	10500	447	8 60	34 9	Oil	Pass. & Fruit, Cen. Amer.	Under con.
Walter Wyman	Spedden S. B. Co. Inc.	Tug	Ocean	200	U. S. Public Health Ser.	Oil Eng.	460	100	8 22	15	Oil	Quarantine Service	Launch. 11/7/31

*Displacement. †Non self-propelled.

« EDITORIAL »

Why Reason Should Prevail In Our Tariff Policy

OUR merchant marine is divided into two major divisions of service, domestic and foreign. Both are suffering severely from lack of business due to the general depression. Both would be helped by an improvement in foreign trade. By selling more automobiles, for instance, to the foreign market, more steel would be required and this in turn would increase the demand for ore brought down the lakes in American ships.

There is sometimes an irony in circumstances which passes all ordinary understanding and inclines one to wonder if our less sophisticated ancestors were entirely wrong in believing in good and evil sprits. The American merchant marine, since the war gave it an impetus, has been struggling with the aid of effective government legislation, to establish itself on a firm going business basis. Strategic routes from the United States all over the seven seas to all parts of the world were laid out to be served by American ships. Under normal conditions the mail pay guaranteed by the government for service rendered would keep them going against the competition of foreign ships costing less to build and operate. Then along comes a world depression as bad or worse in our own country as anywhere else. Freight and passenger traffic dwindle to new low levels. The world finds its supply of ships far in excess of the demand. New ships completed and building to enter these strategic mail routes face a bleak outlook.

It is clear that in spite of government aid our merchant marine either domestic or foreign, cannot be successfully operated on any considerable scale without overseas trade. Therefore, any wise measure which will aid in reviving foreign trade is of paramount importance to the shipping industry. The revival of foreign trade is also of paramount importance in the return of general prosperity. Undoubtedly one of the important factors in the decline of commerce is our present tariff policy.

This country has prospered under a policy of protective tariff in the past not because the tariff assessed has had the effect of destroying foreign trade but because such tariff protection, while serving to prevent dumping of cheap foreign goods to the detriment of our own manufacturers, has not prevented the growth of a tremendous trade. We have bought from and sold to the rest of the world billions of dollars worth of goods during the period of our greatest prosperity. In the fiscal year ending June 30, 1931 our total merchandise exports amounted to $3,084,000,000, a 34 per cent drop, and total imports of $2,432,000,000, a decrease of 37 per cent, from the totals for the fiscal year ending June 30, 1930.

It would therefore seem to be a wise policy for the national welfare to consider seriously some measure of tariff reciprocity. This does not mean free trade. It does not mean a drastic revision downwards. An international discussion of the tariff question is just as much in order as an international discussion on disarmament. It is well recognized that the tariff is a powerful offensive and defensive weapon. In a sense tariff is simply a step toward embargo sometimes used against an offending nation.

We might as well give up the idea that we can live unto ourselves alone in a world which has been made so small and closely knit by modern methods of communication. Actually we are a member of the family of nations and while we should jealously guard our independence of action we must recognize not only the necessity but the advantage of intellectual and mercantile exchange. It is idle to talk about having everything we need within our own borders, that we are self-contained and that we can prosper without contact with the rest of the world. Nothing of the sort. We are instead utterly dependent on maintaining our lines of communication.

We need our own ships. To serve us well they must have an opportunity to prosper. They cannot prosper on the isolationist's theory. Hence we are in favor of a reciprocal tariff policy to promote trade. This is not in any sense of the word a partisan problem. We must buy if we wish to sell and the restoration of foreign trade essential for the welfare of our merchant marine will be a stimulus to our domestic recovery.

Baltimore Mail Liners Demonstrate

Speed, Utility and Economy in Service

By H. T. Dyer

THE Baltimore Mail Steamship Co. inaugurated a new passenger, fast freight and mail service between Baltimore, Hampton Roads ports and Hamburg, with a call at Havre, on July 2, 1931, when the S.S. CITY OF BALTIMORE, the first of five converted ships, sailed on her maiden voyage. As they were finished, at approximately monthly intervals, the other four ships were put in commission and fitted into the schedule, so that for several months there have been weekly sailings of these ships from Baltimore.

The five ships, renamed CITY OF BALTIMORE, CITY OF NORFOLK, CITY OF NEWPORT NEWS, CITY OF HAVRE and CITY OF HAMBURG, were formerly the INDEPENDENCE, VICTORIOUS, ARCHER, ECLIPSE and INVINCIBLE, built for the United States shipping board in 1918. They had originally a deadweight tonnage of about 11,800; length between perpendiculars of 440 feet; beam, 56 feet, and a normal sea speed of 10½ knots.

Increased Length for Speed

After conversion of these five liners, which was done at the Federal Shipbuilding & Dry Dock Co., Kearny, N. J., their characteristics have been changed to the following: Length over all, 507 feet ½ inch; length between perpendiculars, 486 feet; breadth molded, 56 feet; depth molded, 38 feet to shelter deck. The displacement loaded at a draft of 24 feet ¾-inch became 13,525 tons in the case of the CITY OF BALTIMORE; her gross tonnage, 8424, and net tonnage, 5220. Before conversion there were no passenger accommodations, while now 81 cabin passengers can be taken care of on each ship. The cargo capacity in the new condition is 5000 tons and in cubic feet, 427,225 bale, 26,610 refrigerator, 7200 baggage and 7025 stores. The cruising speed was increased to 16 knots and on her trial trip the CITY OF BALTIMORE made 18.25 knots. The problem presented to the naval architect, Gibbs & Cox Inc., was to convert these 10½-knot cargo ships into 16-knot vessels and add passenger accommodations for 81 persons.

The lines of the original ships were satisfactory for the 10½-knot speed, but totally unsuited for 16 knots. A study of this part of the problem and extensive model experiments revealed that by removing the bows and sterns, and adding about 40 feet at the forward end of the ships, with a new design of bow, fitting a new stern frame and rudder, it would be possible to so improve and fair the lines of the ships as to drive them at 16 knots with a reasonable increase in shaft horsepower.

This part of the change worked out so that the appearance of the vessels has been materially improved.

The watertight subdivision of the vessels has been brought up to a two compartment standard by the installation of additional bulkheads and the vessels comply throughout with the requirements of the International confernce for safety of life at sea.

The original machinery installation provided for developing 2900 shaft horsepower with a single propeller. To increase the speed and provide ample margin at 16 knots, a plant of 9500 shaft horsepower was installed with the limitation that the original machinery spaces could not be enlarged, and that a single shaft arrangement must be retained. A study of this problem resulted in the installation of four oil burning Babcock & Wilcox boilers of 20,800 square feet total heating surface, operating normally under forced draft, supplying steam at 275 pounds and 100 degrees Fahr. superheat to a DeLaval steam turbine, fitted with double reduction gears, turning a manganese bronze propeller of about 20 feet diameter at 95 revolutions per minute, made by the American Manganese Bronze Co. In addition to the main units the DeLaval Steam Turbine Co. also supplied the boiler feed pumps which are 2-stage driven by DeLaval turbines and each designed for 250 gallons per minute capacity. The same company also supplied the turbines and worm gears for driving the fans.

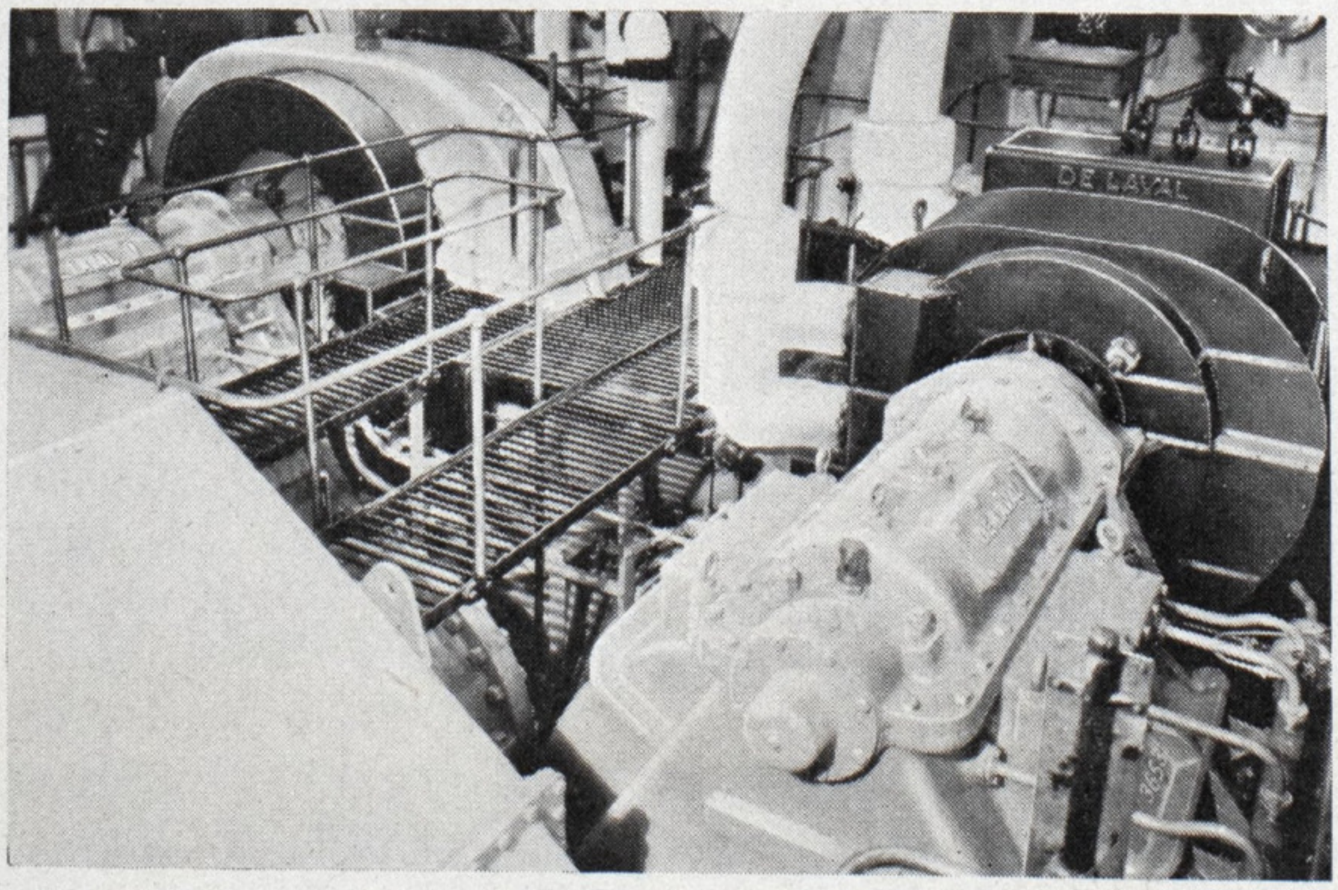
The author, H. T. Dyer, is a member of the staff of Gibbs & Cox, Inc., naval architects.

Good Turbine Economy

This particular pressure and temperture was selected as being capable of giving good turbine economy, without the complications that would be required to maintain the high purity of feed water had considerably higher pressures and temperatures been used, although it was recognized that a certain loss in overall efficiency must be accepted.

Throughout the engineering plant simplicity of parts and arrangements was the keynote, so as to reduce the initial cost of the changes, and at the same time produce a plant that would be easy to operate with the minimum of personnel and upkeep expense.

Auxiliary equipment on the converted ships include: pumps, Worthington Pump & Machinery Corp.; windlass Hyde Windlass Co.; 12 winches, Hyde Windlass Co.; steering engine, American Hoist & Derrick Co.; and electric generators, Westinghouse Electric & Mfg. Co. Interior arrangements of the ships were materially changed, and an entirely new deckhouse fitted, to accommodate passengers. On the boat deck forward, under the bridge, are located rooms for the captain and various other ship's officers. Forward on the deck below, is the lounge;



Engine room, City of Baltimore. De Laval steam turbines and double reduction gear. An efficient dependable modern propelling plant

aft of this, a deckhouse containing eight private rooms, each with its own bath and toilet, and abaft of this is the smoking room. These houses are all set well back from the sides of the ship to provide ample clear deck space for a promenade and for deck chairs. The forward portion of this deck is enclosed and fitted with vertical sliding windows.

The main foyer with the purser's office is on the shelter deck and reached by a stairway from the lounge on the deck above. The starboard side of this deck, and the forward port side is given over to passenger accommodations. The spaces forward and outboard of the purser's office are utilized to form two suites, each consisting of a sitting room, bedroom and bath. There are also six staterooms with private bath and toilet, and 13 staterooms without baths, but provided with running water. All of these are outside rooms and open on two fore and aft inside passageways giving access to the lounge and quarters on the deck above, and to the dining saloon aft on the deck below.

On the port side aft of the passenger rooms are a number of rooms for various ship's officers and also the galley and bakery. All of the compartments used by the ship's company, or for the operation of the ship, are bulkheaded off from the passengers' quarters, although in some locations, doors are provided where access may be required in case of emergency.

On the upper deck level, slightly aft of the center of the ship is the dining saloon extending across the ship and arranged to seat 76 persons in groups of three, four and five, who are served from a large and well-equipped pantry, just forward on the port side.

The ships are arranged to accommodate all types of cargo, lengthy steel, heavy machinery, bulk grain, ores, etc. Carload shipments are handled directly from rail to ship and vice versa. Six hatches are fitted, five of which are for general cargo, one, 16 feet 10 inches by 15 feet; one 20 feet by 20 feet and three 20 feet by 30 feet; also one hatch for refrigerator

Dining room, City of Baltimore

space 10 feet by 20 feet. There are 13 booms, one 30-ton capacity, eight 5-ton capacity and four 3-ton capacity.

An exceptional refrigerated service is provided on these ships for perishable cargoes, the sailings being frequent and fast. Three large refrigerated compartments on each ship are provided for shipments of apples and other fresh fruits, frozen meats and other packing house products. The cooling unit which was supplied by the Brunswick Kroeschell Co. is so arranged that separate temperatures can be mantained in each compartment, with a low point of 10 degrees, thus permitting the carriage of varied types of perishables requiring different degrees of refrigeration. A reserve cooling unit is installed on each vessel for emergency.

There is fitted a Rich Lux fire detecting and extinguishing system in accordance with the requirements of the United States steamboat inspection service which covers the various cargo spaces and engine and firerooms. In addition, fire alarms are provided in passengers' quarters and elsewhere as required to insure maximum safety.

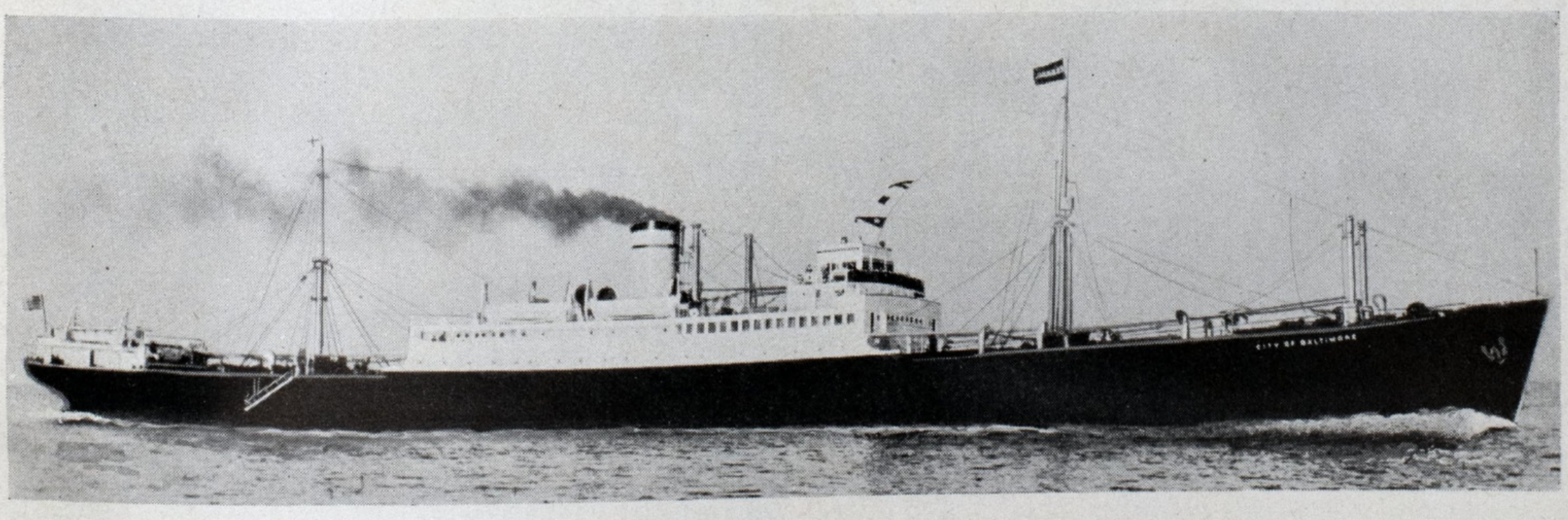
For navigational aids, there are provided a gyro compass (automatic steering), radio direction finder, fathometer and the usual magnetic compasses, and other equipment.

As each ship was completed, a sea trial of about 60 nautical miles, over a measured course, was held to determine the speed and fuel consumption and it was found that all of the ships were easily able to maintain more than the required speed of 16 knots on a moderate fuel consumption, and this has been completely confirmed by six months' experience in the North Atlantic under commercial conditions.

It is interesting to note the trial trip results for the CITY OF NEWPORT NEWS, held Nov. 7, 1931, from Ambrose lightship to Fire Island lightship, a distance of 29 miles. The time elapsed was 1 hour 33 minutes and 58 seconds, an average speed of 18.517 knots with average revolutions per minute of the propeller, 97.84. The return trip was made in 1 hour 35 minutes 29 seconds at an average speed of 18.223 knots and average revolutions, 97.11. The average for the two runs was 18.37 knots. On her trial trip the CITY OF BALTIMORE developed an average of 17.77 knots.

The CITY OF HAVRE made the run from Newport News to Havre, 3341 nautical miles, in 8¼ days at a consumption of 76.3 tons of bunker oil per day; and on her return trip she docked a day ahead of time for the emergency landing of a passenger. The CITY OF HAMBURG, during the night of Feb. 10, established a new record for the run up Chesapeake bay from the Virginia capes to Baltimore, maintaining a speed of between 19 and 20 knots for most of the 190-mile run. The CITY OF HAMBURG also holds the record for ships of the Baltimore Mail fleet for the westward run between Havre and Norfolk, covering this distance in a little over 8 days on her maiden trip in October.

The five ships of the Baltimore Mail line regularly operate at a speed of 16 knots over the Baltimore, Norfolk, Havre and Hamburg route. There is a sailing each week, both east and west.



City of Baltimore—single screw, geared turbine, cargo and passenger liner, one of five Baltimore Mail ships

Conversion of Three Lake Freighters

To Modern Self-Unloading Vessels

By E. B. Williams

THE conversion to self-unloaders of three steamships DIAMOND ALKALI, THUNDER BAY QUARRIES and WM. T. ROBERTS, owned by the American Steamship Co., Boland & Cornelius, managers, Buffalo, is one of the outstanding examples of this type of work carried out in recent years. The conversion was done at the Lorain, O., plant of the American Ship Building Co., Cleveland. As this is written the work is nearly completed and delivery of all three vessels is expected by April, about four months after award of contract.

In general, the conversion consists of hoppering the hold to serve two belt conveyors symmetrically arranged each side of the center line. These conveyors deliver to cross conveyors at the forward end, which, in turn, feed an inclined pan conveyor which carries the cargo to the deck, discharging on a boom conveyor. The boom can be swung over the ship's side through a total arc of 226 degrees.

The most serious problem in the design of a self-unloading vessel, whether it be a conversion or a complete new ship, is to maintain the greatest possible cargo capacity. To insure the proper flow of material, all fore and aft plating has a slope of 35 degrees and the athwartship plating slopes 60 degrees. This necessarily results in a loss of cubic and to minimize this loss the hoppers are made as low as possible. In way of the conveyors, the tank top was recessed to a point 30 inches above the base line. The upper part of the side tanks was cut away, allowing the hopper plating to extend to the shell. The resulting loss to the original capacity was exceptionally low. The loss in midship area was 12 per cent and the overall loss in cubic capacity self-trimmed, 19 per cent.

The author, E. B. Williams, is chief draftsman, hull department, of The American Ship Building Co., Cleveland.

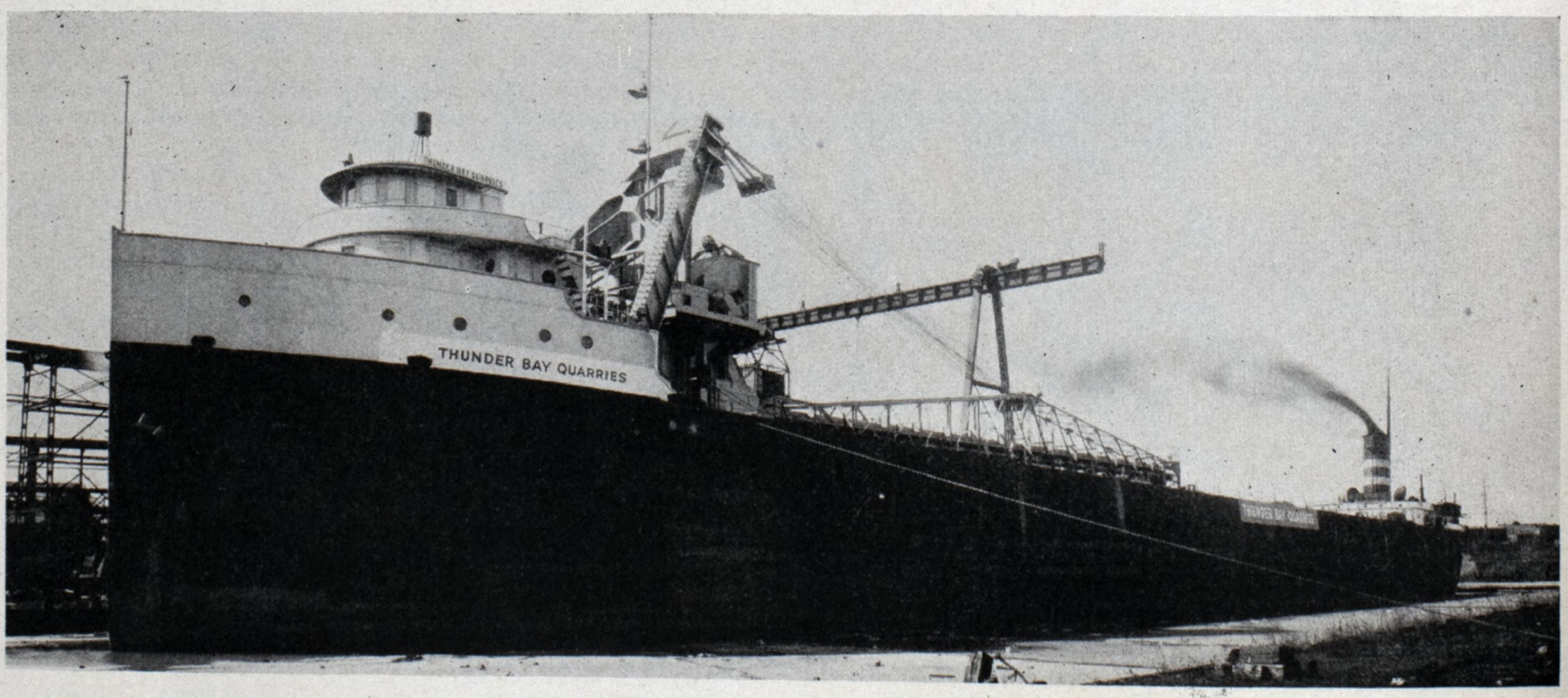
THE self-unloading vessel delivers cargo on dock or to cars and receives payment for discharging as well as hauling. Such a vessel can serve any port or dock regardless of the lack or obsolescence of shore unloading equipment, thus greatly enlarging the range of employment. The system installed in these vessels is dependable. It will work with a minimum of upkeep expense and breakage of cargo. Cubic capacity has been maintained at a maximum consistent with the best possible efficiency of operation.

Editor's Note

An important feature in the design of the conveying equipment is the prevention of breakage of the cargo. Particular stress was laid on this point with the result that throughout the entire system there are no serious drops to cause breakage. Nevertheless, a minimum clearance of 24 inches is maintained over the belts.

The DIAMOND ALKALI and the THUNDER BAY QUARRIES are sister ships, and the principal dimensions are 504 x 56 x 30 feet. The principal dimensions of the WM. T. ROBERTS are 504 x 54 x 30 feet. All three vessels were engaged in the bulk cargo trade on the Great Lakes. They are powered with three-cylinder, triple expansion engines and Scotch boilers. The hatches are spaced 12 feet centers and number 30 in all.

The throat openings of the hoppers are 4 feet 4 inches wide by 3 feet fore and aft and are spaced at 6-foot centers. Hand operated gates of a unique design serve the hoppers. About two-thirds of the opening is closed by a sliding gate to which is attached a hinged plate which closes the remaining portion and also serves as an apron when the gate is open. This feature enabled the hoppers to be spaced more closely than on former vessels with a considerable capacity saving and at the same time prevents breakage by "laying" the material on



Thunder Bay Quarries, one of three bulk cargo carriers converted to self-unloaders by The American Ship Building Co.

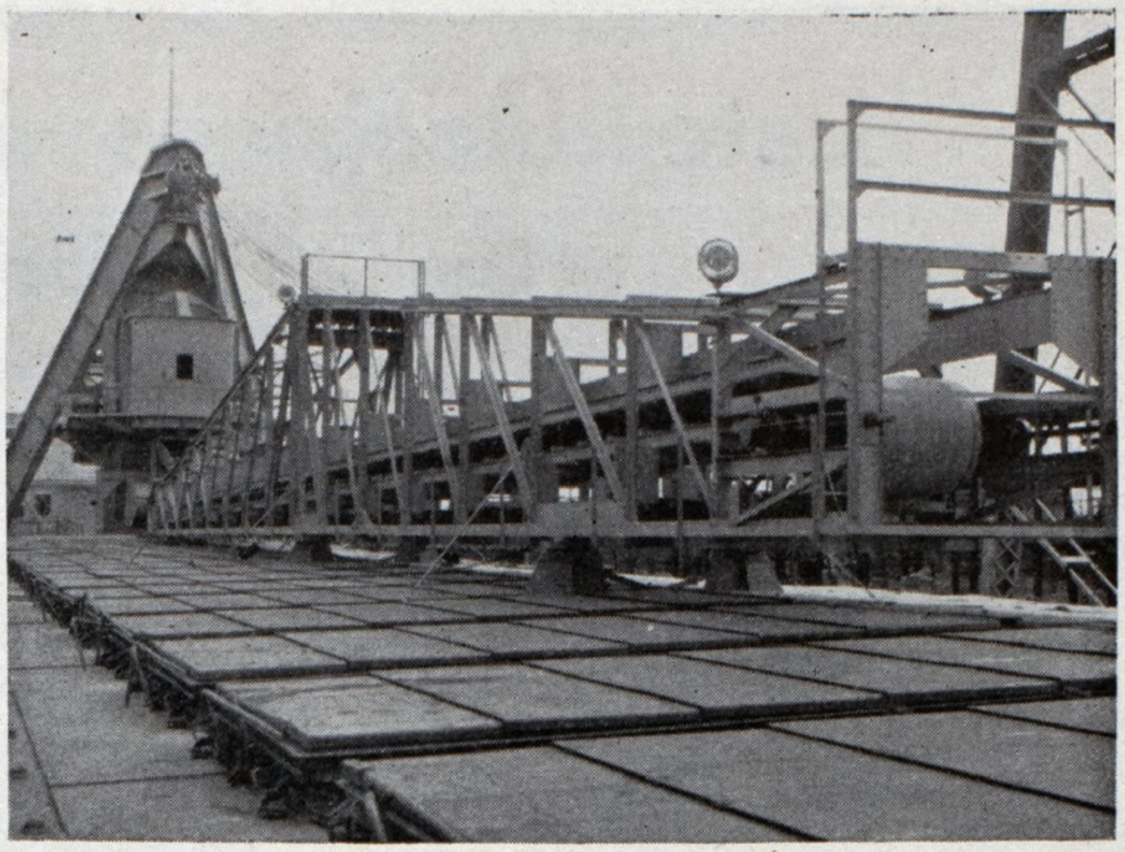
the belt. The tunnels under the hoppers are unusually spacious. The gate operating mechanism is thoroughly accessible with liberal head room at the hand wheels. Ample room is also provided in outboard tunnels.

The two hold belt conveyors are 42 inches wide and are carried on 4 inch diameter troughing idlers spaced 2 feet centers with return idlers at 9 foot centers. At the forward or discharge end the belts rise on a radius of 300 feet to a point about 15 feet 6 inches above the tank top, discharging on to cross-conveyors and thence to the pan conveyor. Each belt is driven by a 75 horsepower, 900 revolutions per minute, 440 volts, 3 phase, 60 cycle, squirrel cage motor. The belt speed is 350 feet per minute.

The cross-conveyors, transferring the material from the hold belts to the pan conveyor, are 42 inches wide and of similar design. They are driven from off the head pulley of the hold conveyors by means of mitre gears with chain and sprocket reduction.

The pan conveyors, elevating the material to the deck and discharging on the boom conveyor is 96 inches wide and has a capacity of 1800 long tons of stone per hour. The inclination is 42 degrees and the total lift about 48 feet. A 200 horsepower, 720 revolutions per minute, 440 volts, 3 phase, 60 cycle motor with a solenoid operated brake drives the conveyor at a speed of 81 feet per minute. The drive is located at the head end, operating through a Robins-Falk herringbone reduction gear.

From the pan conveyor the material passes through a cast steel chute to the boom conveyor which is 160 feet long by 48 inches wide. The belt speed is 460 feet per minute. The boom is pivoted to the deck at the tail end under the elevator discharge chute and may be swung over either side of the ship through a total arc of 226 degrees and with a maximum inclination of 20 degrees amounting to a lift of about 55 feet at the head end. The boom drive is located at the tail end and consists of a 200 horsepower, 720 revolutions per minute, 440 volts, 3 phase, 60 cycle motor with a solenoid operated brake.



Thunder Bay Quarries, one of three bulk carriers converted to self-unloaders, showing the substantial A frame structure with boom and belt for discharging cargo over side of ship. Maximum arc of swing of the boom is possible with this arrangement

The entire conveying equipment, including belts and drives, was furnished by the Robins-Conveying Belt Co. All of the conveyor motors and solenoid brakes were furnished by the General Electric Co.

The main control panel for the conveying machinery is located on the starboard side of the main deck forward, enclosed by steel partitions. Control stations for the boom and pan conveyor are located on the spar deck port and starboard. The hold conveyor station is at the head of the system, so that the operator can watch the material coming off the cross conveyors to the pan conveyor. The hold conveyors may be stopped at any time, port or starboard, by a pull cord running the entire length of the tunnel. Each conveyor is operated independently or in sequence, so that if any conveyor is stopped, the conveyors ahead continue and those behind stop. Adjacent to each of the three main control stations is located a push button with a horn in the tunnel, and by means of a code of signals, the entire system is under the control of the chief operator.

Electrical energy to operate the conveying machinery is supplied by a 500 kilowatt, 3600 revolutions per minute, 480 volts, 3 phase, 60 cycle, Westinghouse condensing turbo-generator set with direct connected exciter, taking steam at 175 pounds with no superheat. The condenser is a Wheeler, 750 square feet, surface type, operating at 26 inches vacuum. It is interesting to note that the ship's original boiler capacity was sufficient to take care of the unloading requirements with considerable margin.

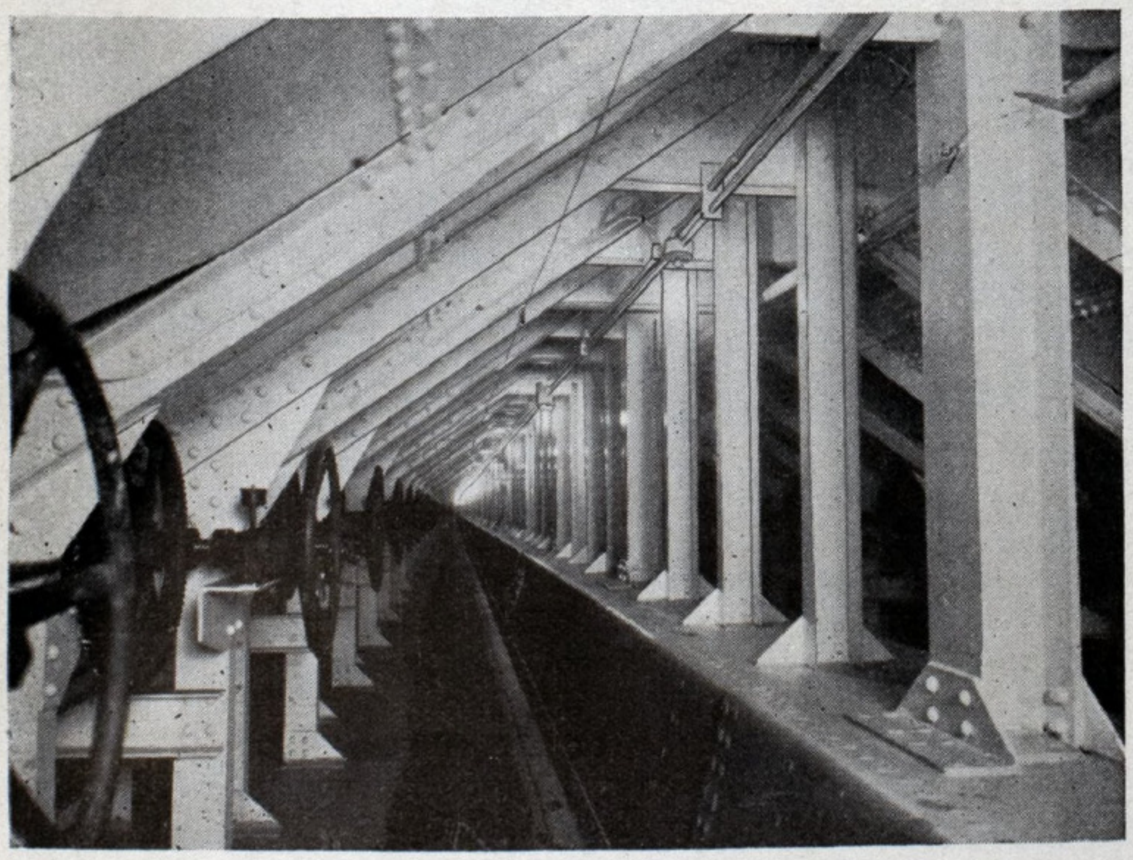
The tunnels are exceptionally well lighted with a double row of lights through the main operating tunnel and single rows outboard. Additional lights are located between hoppers. Adequate lighting is provided at the head end of the conveyors. Flood lights are provided on the boom and "A" frame in addition to the deck lights. A 35 kilowatt, General Electric 11 x 8 inches Simplex engine generator set has been installed aft in the fan tail to meet the extra lighting requirements.

For draining the tunnels and forward recess under the pan conveyor, two Morris 4-inch motor driven dredge pumps were installed, one forward and one aft. Owing to the recess in the inner bottom, the ballast piping was relocated in the outboard tunnels on the tank top.

Three 8¼ x 8 inches Lidgerwood reverse valve steam winches were installed for swinging the boom, two being used for the swing and the third for the tag line. These machines were located over hatch No. 29, which was decked over. A Clyde 10 x 12 inches steam, two drum winch was installed over the pan conveyor housing above deck to serve as a boom hoist.

Each vessel has a rated designed unloading capacity of 1800 long tons per hour of stone weighing 90 pounds per cubic foot, or 1120 short tons of coal. The equipment is capable of a 20 per cent overload when in opera-

As converted, the sister ships DIAMOND ALKALI and THUNDER BAY QUARRIES have a self-trimmed hold capacity of 363,200 cubic feet. The capacity of the ROBERTS is 369,700 cubic feet.



Under the hoppers of the Thunder Bay Quarries showing the gate controls from the hoppers to the two continuous belts which deliver the cargo to the forward end where in turn it is raised to the hopper on deck and deposited to boom for discharge over side

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

WHERE merchandise is shown to have been received in good order and condition and delivered in bad order and condition, the shipowner must show a seaworthy vessel and that the merchandise was properly stowed in a proper berth; it must satisfactorily explain these matters; such proof cannot be supplied by speculation.—Cafiero & Mencacci v. Navigazione Libera Triestina, S. A., 50 F. (2d) 199.

* * *

LIMITATION of liability is permissible only where the owner of the vessel can show lack of knowledge or privity of unseaworthy condition; the burden of showing which is on the owner. Where the unseaworthiness is due to a generally decayed condition of the vessel which renders it unable to withstand the ordinary wear and tear of service, the owner's lack of knowledge can only mean that the owner did not inspect the vessel or provide a regular system of inpection. In the case of Dexter-Carpenter Coal Co. v. N. Y., O. & W. Ry. Co., 50 F. (2d) 270, the evidence established that the barge in question had seen its best days long before the commencement of the trip on which she sank, and its unfitness visible to any one on careful inspection. "Under such circumstances," said the court, "proof by the owner that repairs had been made to the barge several months before the sinking and that a carpenter in its employ went over its boats and did minor jobs on them, does not suffice to bring the case within the limitation act."

* * *

A LEGAL obligation rests upon a ship to use due diligence to save one of the crew, who, by his own neglect, falls into the sea; and the owners are liable if, by failure to perform this duty, his life is lost. The reason is apparent, it was said in the case of Harris v. Pennsylvania Railroad Co., 50 F. (2d) 866, when we consider the peculiar relationship of the seaman to his ship, which, irrespective of statute, has been recognized from the earliest period. There is no other peaceful pursuit in which the dominion of the superior is so absolute and the dependence of the subordinate so complete, as in that of a sailor upon a vessel at sea. He binds himself by the contract of employment to serve the ship during the voyage, and desertion may be made an offense punishable by imprisonment. He owes obedience while on shipboard to his superior officers, and is bound to execute their lawful commands even at the risk of danger to his person or his life; and their right to enforce obedience by proper discipline and punishment has been recognized. If he is taken sick or is injured on board the ship, or is cast into the sea by the violence of the elements or by misfortune or negligent conduct, he is completely dependent for care and safety upon such succor as may be given by the members of the crew. By reason of these conditions, the maritime law extends to mariners a protection greater than is afforded by the general rules of common law to those employed in service upon the land. From time immemorial, seamen have been called "wards of admiralty;" and in this country as elsewhere the legislature has enacted an elaborate system of legislation for their protection. Regardless of legislation, it is universally recognized that it is the duty of a vessel to care for a seaman who is taken sick or receives an injury on a voyage in the service of the ship, to the extent of providing medical care and attendance, and, if possible, a cure at the expense of the ship. And it is even required, where a serious accident occurs, that the master shall exercise reasonable judgment as to putting into the nearest available port, in order that proper treatment may secured. Equally clear is the obligation upon the part of the ship to save the life of a sailor who falls overboard through a misadventure, not uncommon in his dangerous calling. It is absurd to admit the duty to extend in the lesser emergency, and to deny it in the greater. In both cases, it is implied in the contract that the ship shall use every reasonable means to save the life of a human being who has no other source of help. The universal custom of the sea demands as much wherever human life is in danger. The seaman's contract of employment requires it as a matter of right.

* * *

COMPENSATION for services in rendering assistance to a ship at sea or her cargo, or both, from impending sea peril, when successful and voluntary, is a maritime lien upon the ship or cargo, or both and may be impressed in rem; and where the owners or underwriters employ such services, proceedings in personam against the employed may be had. There is no authority to proceed against the ship in rem and in personam against the employers in the same libel.—Georgia Co. v. Richfield Oil Co., 50 F. (2d) 901.

* * *

A SALVOR is entitled to a salvage award as against anyone whom he may have benefited by successful salvage services. * * * A claim for salvage may be maintained in personam against any party whose relationship to the vessel or thing salved is such that he might have been liable in respect of its damage or loss, or who, though not its owner, is benefited by its being salved, as was the case where the salving of cargo gave the United States an opportunity to impose customs duties on it. * * Although, generally speaking, the ship and cargo must proportionately bear the salvaged expenses where there is a common peril, yet, where the salvage services are rendered necessary by the ship's negligence, the cargo may be relieved from contribution and the vessel bound for the entire expense.—Tice Towing line v. James McWilliams Blue line, 51 F. (2d) 243.

* * *

UNDER an exemption clause in the contract of carriage, "No claims for variation of weights or shrinkage will be allowed except in case of loss due to negligence on the part of the carrier," to effectively claim the ex emption from liability for shortage, the operator of a barge line, it was declared in the case of Inland Waterways Corp. v. Hallet & Carey Co., 52 F. (2d) 13, must show that the exemption claimed is within the terms of the contract, and this is not shown by simply showing a shortage; it must also show that the shortage was a non-negligent one.

* * *

NAVIGABILITY of a stream in law is dependent upon navigability in fact. The old doctrine of the common law that the ebb and flow of the tide establishes navigability has no application in this country.—Clark v. Pigeon River Improvement Slide & Boom Co., 52 F. (2d) 550.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	312	1,875,981	322	1,776,394
January	297	1,821,335	305	1,719,978
December	314	1,692,258	343	1,744,190
November	304	1,564,284	308	1,542,849
October	309	1,626,094	322	1,708,560
September	523	2,724,761	522	2,641,711
August	541	2,785,703	531	2,739,919
July	538	2,626,814	563	2,754,107
June	541	2,747,134	526	2,596,749
May, 1931	478	2,434,601	511	2,542,351

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	49	150,899	34	98,667
January	51	168,266	36	114,982
December	58	180,172	42	132,734
November	52	148,335	37	111,969
October	69	192,159	57	160,609
September	66	172,313	54	155,113
August	81	208,854	59	147,948
July	76	201,677	59	155,114
June	75	218,611	50	127,906
May, 1931	82	235,108	62	170,497

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	107	315,036	63	213,166
January	94	286,508	61	208,491
December	102	313,977	65	240,908
November	75	241,142	52	166,786
October	98	325,261	66	241,072
September	109	339,482	78	263,783
August	131	388,799	98	305,488
July	131	362,111	94	290,733
June	130	347,787	97	264,467
May, 1931	108	311,171	91	293,146

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	20	53,793	20	56,558
January	13	28,179	14	28,955
December	18	38,860	18	37,319
November	17	40,991	19	47,514
October	17	39,060	16	34,195
September	27	48,534	26	52,035
August	29	50,249	23	39,273
July	24	52,979	22	52,945
June	17	28,216	17	26,397
May, 1931	12	20,821	11	22,573

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	5	19,442	4	18,533
January	8	41,147	4	21,654
December	11	41,268	4	17,037
November	9	35,826	5	18,040
October	6	23,833	6	23,836
September	6	20,330	3	11,160
August	10	41,671	3	12,240
July	6	25,062	7	30,748
June	6	21,104	3	12,211
May, 1931	9	37,120	2	8,674

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	32	127,810	36	149,417
January	27	112,542	42	168,762
December	29	114,184	40	154,060
November	26	103,835	47	182,585
October	36	144,875	54	207,518
September	32	126,256	49	199,803
August	29	114,582	31	119,968
July	28	107,694	48	174,226
June	30	116,953	35	139,799
May, 1931	24	94,695	39	142,847

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	105	337,487	98	323,603
January	95	301,958	102	328,876
December	102	330,709	106	354,320
November	99	304,138	98	314,109
October	116	388,308	111	385,136
September	111	350,556	117	362,970
August	122	374,434	118	377,085
July	125	393,553	120	379,526
June	127	376,049	114	338,066
May, 1931	110	353,301	118	368,874

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	22	68,136	48	121,647
January	17	53,536	38	104,392
December	30	95,762	38	110,614
November	23	77,075	47	113,416
October	25	76,385	54	146,995
September	24	72,333	47	104,255
August	21	59,408	54	127,864
July	31	77,082	63	149,665
June	39	108,710	59	167,488
May, 1931	22	63,739	49	140,356

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	8	18,785	10	21,812
January	8	26,601	12	27,759
December	12	25,453	10	21,501
November	6	14,295	8	22,180
October	10	25,659	9	17,710
September	6	12,463	8	18,888
August	21	61,439	24	70,922
July	9	18,703	5	9,297
June	11	24,902	13	24,517
May, 1931	8	21,046	7	11,045

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	39	59,334	39	66,392
January	43	67,913	42	71,873
December	39	68,392	40	73,365
November	40	53,752	42	53,497
October	37	57,588	37	59,408
September	36	54,012	35	55,610
August	37	56,505	37	56,505
July	39	59,268	41	62,526
June	63	81,660	63	86,349
May, 1931	83	91,683	80	90,758

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	101	235,846	96	219,215
January	110	253,792	112	242,378
December	98	226,656	85	214,395
November	100	214,204	87	189,474
October	118	251,661	112	253,721
September	104	213,204	102	226,192
August	113	217,541	97	194,678
July	101	229,960	92	212,634
June	88	197,952	93	217,151
May, 1931	103	194,198	93	194,198

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	50	217,837	54	232,138
January	48	200,281	50	216,819
December	50	218,018	48	204,111
November	48	209,655	50	215,614
October	61	257,329	62	267,366
September	52	229,687	50	217,517
August	48	202,879	51	213,091
July	46	207,651	50	222,816
June	52	220,915	52	223,750
May, 1931	43	185,945	43	184,118

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	157	436,882	169	469,296
January	171	516,707	171	506,411
December	169	482,802	170	504,981
November	173	498,800	169	483,099
October	174	502,867	195	563,095
September	171	474,876	179	508,560
August	179	484,245	172	474,230
July	184	539,810	172	509,475
June	193	561,399	190	562,090
May, 1931	185	532,046	192	551,459

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
February, 1932	32	88,616	27	75,262
January	24	73,488	22	16,217
December	37	108,083	35	96,490
November	19	31,125	11	35,588
October	20	49,738	22	55,371
September	16	29,428	11	19,111
August	9	18,293	7	6,274
July	13	26,985	10	20,974
June	10	23,571	9	21,074
May, 1931	9	16,418	7	11,884

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	27	64,866	101	317,095
January	26	73,215	92	292,274
December	37	113,327	111	358,950
November	33	81,906	101	328,883
October	35	80,748	112	354,607
September	27	63,896	99	320,127
August	39	85,793	79	234,583
July	46	107,008	75	226,381
June	35	66,342	73	205,074
May, 1931	27	53,091	69	191,632

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	164	627,876	158	622,730
January	144	578,699	149	594,384
December	153	517,165	136	506,985
November	147	503,238	142	535,870
October	215	720,162	193	678,776
September	199	580,683	196	593,882
August	199	673,223	204	676,036
July	170	622,694	176	636,440
June	179	659,029	149	568,208
May, 1931	210	696,717	194	731,392

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	149	638,222	144	583,030
January	145	635,218	147	646,987
December	155	649,915	122	579,608
November	167	688,934	149	614,482
October	167	688,934	149	614,482
September	158	658,088	159	673,120
August	140	636,189	160	665,108
July	173	743,588	155	679,657
June	159	663,047	155	634,838
May, 1931	161	658,525	163	676,789

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	25	103,589	43	162,236
January	25	108,322	36	145,084
December	26	99,354	42	148,568
November	34	139,899	62	225,833
October	28	126,071	52	194,114
September	34	132,684	45	163,144
August	31	127,112	44	163,103
July	35	148,988	45	178,091
June	23	115,140	38	139,102
May, 1931	23	101,100	39	152,690

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 61 of 213,950 net tons entered and 50 of 167,708 net tons cleared for the month of February.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

THE keel of the first sister ship for the Colombian line for operation between New York and Colombian ports was laid March 10 at the Newport News Shipbuilding & Dry Dock Co. The keel of the second vessel was laid a few days later. The first vessel is to be named the COLOMBIA and the second the HAYTI. The first will be ready for service in November and the second in December. Both vessels will be among the finest of their type and are being built under the terms of the Jones-White shipping act of 1928.

They will cost approximately $2,300,000 each and will be of 5500 gross tonnage with a length of 385 feet and a beam of 57 feet. They will be equipped with geared turbine machinery having a normal shaft horsepower of 6500, which will drive the ships at an average speed of 16 knots. A total of 54,000 cubic feet of refrigerated space will be provided.

Luxurious accommodations will be provided for more than 100 first class passengers and the public rooms will be decorated especially for tropical cruise service.

The SANTA ROSA and other ships of the fleet will have accommodations for 222 first-class passengers. Each stateroom is an outside room and each has a private bath, either shower or tub, or both. As the greater part of the run will be in the tropics, elaborate systems of mechanical ventilation will be provided, as well as large windows in the public rooms for ventilation and light.

Gibbs & Cox Inc., naval architects, of New York, are designers of the ships.

Launch New Grace Liner

The SANTA ROSA, first of the four new ships building for the Panama Mail service of the Grace lines, was launched March 24 at the Federal Shipbuilding & Drydock Co. yard, Kearny, N. J. Prominent officials, including Walter F. Brown, postmaster general, representative of Latin-American nations and the governors of three states attended the ceremony.

The ship was sponsored by Miss Wendy Iglehart, daughter of D. Stewart Iglehart, president of W. R. Grace & Co. Mr. Brown spoke over a radio network from 10 to 10.15 a.m. and the launching of the ship and the addresses of Governors A. Harry Moore of New Jersey, Gifford Pinchot, of Pennsylvania, and Joseph F. Ely, of Massachusetts, were broadcast. T. V. O'Connor headed a delegation of members of the United States Shipping board from Washington.

On completion, the ships of the fleet will enter a new passenger, mail and freight service between the east and west coasts of the United States, from New York to Los Angeles and San Francisco, by way of the Panama canal, with additional stops at Havana, Cartagena, Acapulco and other Central American ports.

All-Welded Tanker

The all-welded steel tanker LUCY was launched March 16 from the yards of the Brewer Drydock Co. at Mariners Harbor, Staten Island, for the Reinauer Transportation Co. Mrs. Lucy Reinauer, wife of the president of the transportation interest, sponsored the new tanker.

The LUCY has been built to augment the fleet of the Reinauer company, which is engaged in carrying gasoline from the refineries at Carteret, N. J., to distributing stations on Long Island Sound.

The vessel is 147 feet 6 inches long and 26 feet wide and has a capacity for 230,000 gallons of gasoline. The propulsion machinery consists of a 400 horsepower Ingersoll-Rand diesel engine.

Building Three Motorships

Three motorships of the most modern type and expected to make 18 knots on their trials are now actually under construction in Dutch shipyards for the Interocean line service between the Pacific Coast and Continental Europe, France, Belgium and Holland.

The vessels will have a deadweight of 9500 tons and have the following principal dimensions: Length, 456 feet; beam, 61 feet; depth, 39 feet 6 inches; draft, 26 feet 10 inches.

The engines will be seven cylinder, double acting, two cycle, diesel engines, of about 8800 indicated horsepower. They are calculated to develop 18 knots on their trials, but the vessels will be operated on a 16-mile sea speed. The time from California via the Panama canal direct to first port in Europe will be only 20 days.

Although built mainly as cargo liners, they will have accommodations for 12 passengers, just sufficient to make the traveller feel like being on a private yacht, while speeding on the modern way to Europe in 20 days only. There will be attractive dining and smoking rooms, plenty of deck space, and each cabin will have separate shower bath, will be well ventilated, and equipped with modern beds. There will be running ice water in each cabin besides hot and cold water.

Ask Bids for Two Towboats

The Inland Waterways Corp. has asked for bids for the construction of two 1000 horsepower shallow draft twin screw diesel towboats.

Bids for the construction of the boats are asked under a condition where the Inland Waterways Corp. furnish the main diesel engines and other auxiliaries as shown in specifications.

Proposals will be opened at 11 o'clock on April 18, at the office of the corporation, 1016 Munitions bldg., Washington.

Reconditioning Loan

The shipping board March 23 approved the application of the Mississippi Shipping Co. for loans from the construction loan fund, to be used in the reconditioning, remodeling, improving and equipping of the vessels CASEY and CLAVARACK. These vessels are a part of the fleet operated in the Delta line (formerly the Gulf Brazil River Plate line), purchased from the shipping board. There will be a separate loan, not to exceed three-fourths of the cost of reconditioning, remodeling and improvement of each of the vessels, and not to exceed $201,128 for each vessel. The work will be performed in a shipyard in the United States under plans and specifications approved by the board, and the vessels will remain documented under the laws of the United States. The reconditioning will consist of the addition of passenger accommodations, increasing the power of the vessels' propelling machinery and fairing certain parts of the hulls to give increased speed. Bids will be due on April 11. The naval architect is V. M. Friede.

Upon completion of the work the name of the CASEY will be changed to DELMUNDO and the name of the CLAVARACK to DELVALLE. There will be accommodations for 39 persons.

Rebuilding Four Vessels for American Scantic Line

Contracts have been awarded the New York Shipbuilding Co., Camden, N. J., for the rebuilding of four of the 11 vessels of the American Scantic line.

The steamers BIRD CITY, CHICKASAW, SCHENECTADY and SAGAUCHE will be rebuilt, the work including the installation of entirely new accommodations for 72 passengers. The accommodations, to be amidships, wil, in addition to the passengers, house a doctor, steward, hospital, ship's officers and public rooms.

The total cost of reconstruction will be $1,360,000, three-quarters of which has been loaned to the steamship company by the United States shipping board under provisions of the Jones-White shipping act of 1928.

The work on the four liners will be completed within the next six months, the steamer BIRD CITY, the first of the ships to go to the shipyard, re-entering service on June 9, and will be followed by the other three every two week thereafter.

The cargo space also will be enlarged and will include a number of cold storage compartments. Officers' and crew's quarters will be enlarged and improved, as will the navigation spaces, with great improvements also being effected on the ship's bridge, where every modern device for the safety of navigation, including a gyrocompass, automatic steering gear and fathometer, will be installed.

The public rooms will include a large sun deck, inclosed promenade dack, a lounge, writing room, social hall, smoking room and a spacious dining room with a seating capacity for the entire passenger list.

All of the passengers' rooms will have private baths with hot and cold fresh and sea water. They will be of modernistic design and generally provide for two in a room. Four large windows will open directly to the sea.

Additional cargo space has been provided by the erection of a shelter deck, which, in addition to providing more freight space, increases the freeboard of the vessels, making them comply with the international rules for safety of life at sea.

The refrigerated space will be located in three of the ship's holds and will be fitted especially to carry citrus fruit eastbound and products requiring heavy freezing westbound. This is an entirely new departure for vessels in the Baltic trade as little refrigerated cargo now moves to the ports served by the American Scantic line.

Board Combines Services To Effect Economies

The Oriole line, a shipping board freight service operating between North Atlantic ports and west coast United Kingdom and Irish ports, will be combined with the American Hampton Roads line, also a shipping board service operating from North Atlantic ports to London and other East coast United Kingdom ports. The combined services will be managed and operated by the Southgate-Nelson Co., present operator of the American Hampton Roads line.

The trade names "Oriole Line," "American Hampton Roads Line," as well as a portion of the "Yankee Line," all three of which are under the management of the Southgate-Nelson Co., will be continued under the combined services. Adequate and frequent service between North Atlantic ports, including Halifax, N. S., and St. Johns, N. B., and United Kingdom and Irish ports will be provided.

Build Ship Signal Towers

Construction of two signal towers to control ship traffic in the Port of New Orleans during high river stages is to be effected immediately through joint co-operation of the Crescent River Pilots' association and the board of port commissioners. The towers are to be erected on top of the Barracks street wharf and the South Pacific wharf in Gretna. They will be 47 feet high, topped with glass enclosed cages.

German Line Receives Government Aid

The German cabinet on March 19 approved a plan for relief of German shipping which includes the pooling of resources of the North German Lloyd and the Hamburg American lines under a joint board of directors.

The cabinet approved the establishment of a guaranty fund of 77,000,000 marks for shipping, and the two big passenger lines will be the chief beneficiaries. Tramp steamers will receive 7,000,000 marks in aid. The fund is to be available in guaranty loans, which the shipping companies will obtain from bankers.

The North German Lloyd and Hamburg American lines have been partners since 1930 in a working alliance and the new plan will bring them still closer, although no actual merger will take place. Supervisory boards of both companies will be composed of the same members. A thorough financial reconstruction of both companies will be effected, as well as extensive subsidies and guaranties with which the Reich authorities hope to tide German shipping over the present crisis.

A plan has been drawn up which will radically reduce the capital stock of both companies so that 10 original shares will in the future represent only three shares. The present capital of the Hamburg-American line amounts to about 160,000,000 marks and that of the North German Lloyd to 165,000,000 marks. The sharp curtailing in stock is considered sufficient to write down the assets, especially of the boats, in accordance with the present abnormal values.

A credit of 26,000,000 marks recently granted the Hamburg and North German Lloyd by the banking consortium, due on March 31, will not only be prolonged and guaranteed by the Reich but the banks will extend another loan of the same amount which likewise is to be guaranteed by the Reich, this bringing the total to 52,000,000 marks.

The two lines will receive a further subsidy of 20,000,000 marks for ship-breaking purposes.

Bunker Prices

At New York

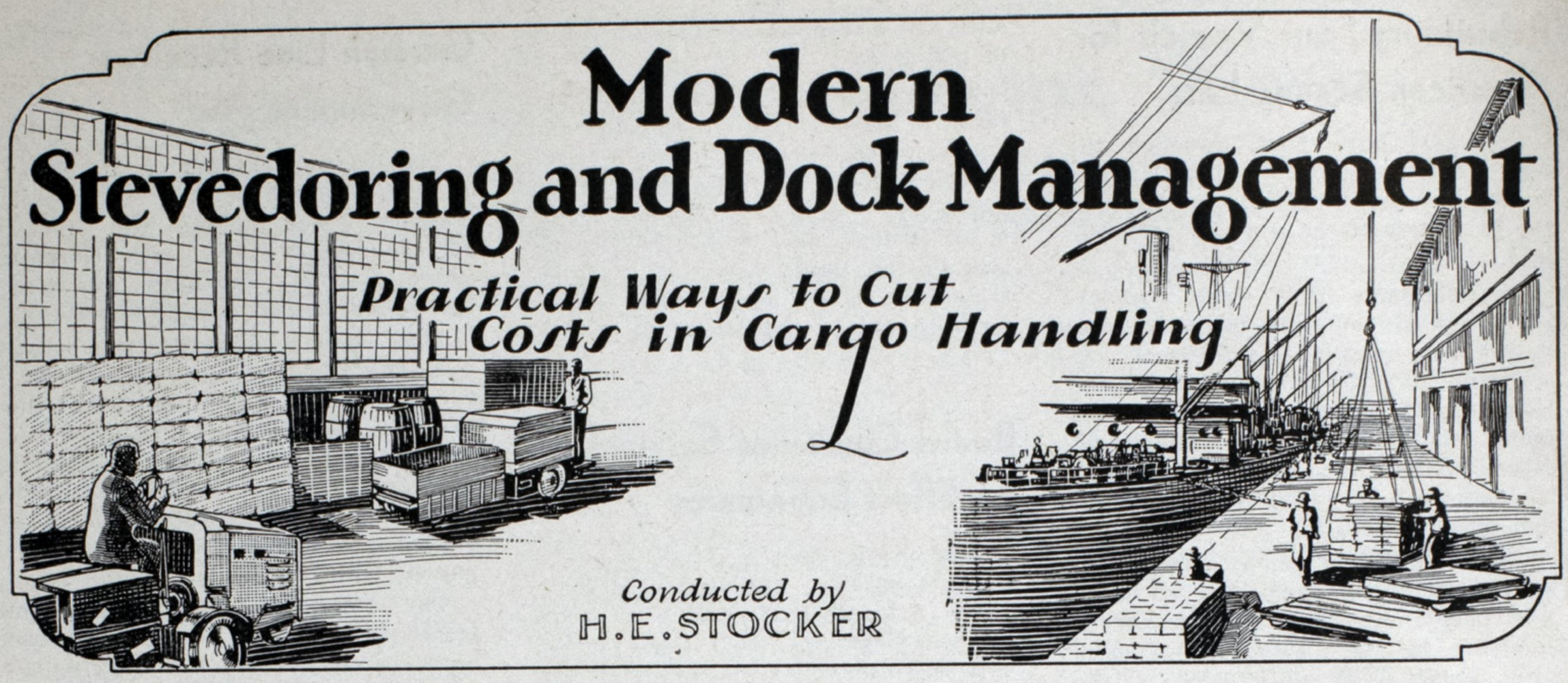
	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Mar. 18, 1932	4.50@5.00	.65	3.25
Feb. 18	4.50@5.00	.65	3.25
Jan. 18	4.50@5.00	.65	3.25
Dec. 18	4.50@5.00	.65	3.25
Nov. 18	4.50@5.00	.65	3.25
Oct. 18	4.75@5.00	.65	3.25
Sept. 18,	4.75@5.00	.75	3.47½
Aug. 18	4.75@5.00	.75	3.47½
July 18	4.75@5.00	.85	3.72½
June 18	4.85@5.25	.90	3.84½
May 18, 1931	4.85@5.25	1.00	4.08

At Philadelphia

	Coal trim in bunk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Mar. 18, 1932	4.50@5.00	.65	3.21
Feb. 18	4.50@5.00	.75	3.45
Jan. 18	4.50@5.00	.75	3.45
Dec. 18	4.50@5.00	.75	3.45
Nov. 18	4.50@5.00	.75	3.45
Oct. 18	4.75@5.00	.75	3.45
Sept. 18,	4.75@5.00	.75	3.45
Aug. 18	4.75@5.00	.75	3.45
July 18	4.75@5.00	.85	3.70
June 18	4.85@5.25	.90	3.80
May 18, 1931	4.85@5.25	1.00	4.1

Other Ports

Boston, coal, per ton	$7.60
Boston, oil, f. a. s., per barrel	0.74
Hampton Roads, coal, per ton, f.o.b., piers	$3.85 to $4.00
Mar. 9—Cardiff, coal, per ton	13s 6d
London, coal, per ton	—s —d
Antwerp, coal per ton	20s 6d
Antwerp, Fuel oil, per ton	67s 6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d



Quick Turnaround, a Prime Essential in Reducing Operating Cost

By H. E. Stocker

MOVEMENT is the essence of transportation, therefore time spent at terminals by a transportation unit, ship, railroad car, motor truck, airplane or industrial truck, must be reduced to the lowest practical minimum. Constant effort must be made by the management of a transportation company to find new ways to reduce terminal time. These efforts are constantly developing new methods and new types of equipment that reduce handling of freight. By these means the time a transportation unit is tied at a terminal is reduced.

One of the best examples of the co-ordination of motor truck and water transportation and prompt loading and unloading of transportation units, is found at the Fay Transportation Co., which operates a line of self propelled barges on the Sacramento river and San Francisco bay. This operation was described and illustrated in the March 1931 issue of MARINE REVIEW.

Costs and Damages Reduced

When two wheel hand trucks were used by this company, approximately 13,000 cases of canned goods were unloaded in three days. Since the cans have been placed on skid platforms and loaded, carried and unloaded on these same platforms, 11,000 cases are unloaded in about three hours. The space occupied by the skids reduces the total cargo handled per trip but the greater speed with which the cargo is handled increases the total yearly capacity of the barges. In addition to getting more tonnage per year, costs are cut by having unit packages and damage is reduced by reducing the handlings.

On Increasing Unit Load

This excellent result is obtained because 60 to 70 cases, depending on their size, are handled as a unit, compared with 5 to 10 case units handled when hand trucks were used. The average load is increased several hundred per cent, and the heavier load is carried at a faster speed by one man. The hand trucker picks up his small load in about five seconds and drops it in about three seconds. The driver of the power truck picks up a heavier load in four seconds and drops it in the same time. The power truck will handle approximately 29 times as much freight in an hour as the man operating a hand truck.

This same operation affords a similar example in motor trucking transportation. The Fay Transportation Co. sends skids to the canners up the Sacramento river where they are loaded at the sealer. The cases are made into an economical shipping unit as the last manufacturing operation is completed. The loaded skids are held in storage until the barge is ready to be loaded, then they are run on to motor trucks for the haul to the barge line terminal. Six skids are loaded on a truck, a total of 360 to 450 cases. Although the load is decreased, the total annual carrying capacity is increased because in handling cargo on skids the transportation time is increased. This is an effective example of co-ordination of plant, truck and barge line transportation.

Reduction of handling is divided into three classifications—horizontal handling or hauling, vertical handling or lifting, and handling that is a combination of the two.

Horizontal handling is put on an efficient basis by reduction of hauling distances either by concentrating operations in one spot or by eliminating cross hauls. In manufacturing operations, this is known as straight line production.

Reduction in Handlings

The goal is to reduce all handlngs to the minimum and when handling *is* necessary to perform the handling by gravity if possible, because when gravity is used there is no expense for power, or by mechanical equipment, when gravity isn't possible.

In this way costs are reduced to the minimum because although mechanical handling requires investment in equipment and use of power, this equipment reduces the need for labor to such an extent that large net economies result. Mechanical equipment is more efficient than the hand method. With a lift truck costing $3000 one man can lift and haul a

six thousand pound load at a good speed.

The SEATRAIN is another example of the reduction of time at terminals by handling larger units of cargo mechanically. In the ordinary ship the units handled are small, weighing from a few pounds up to one thousand to two thousand pounds, depending on the trade and other conditions. The SEATRAIN method makes a railroad carload the unit of handling. The ship has four standard gage tracks on all decks. The cars are handled between ship and shore at New Orleans and Havana, the terminal ports, by large cranes working in conjunction with large elevators in the ship. From fifteen to twenty cars can be handled in one hour. The total cargo is ninety-five cars. This large ship will carry only 1500 to 2000 tons of average cargo but this cargo is handled so quickly, because it is packed in large units, that the ships can make a round voyage each week.

Packing Costs Are Eliminated

The SEATRAIN method has other distinct advantages. The packing costs of the shippers are reduced, in some cases the packing costs are eliminated entirely. In shipments of liquids, tank cars are used, and the costs of drums or other packing is eliminated. Lighter packing material is used in some cases because with reduction of handling, less damage occurs and since the cargo is not stowed in the usual manner, stowage damage is eliminated.

Contrasted with the SEATRAIN, some ships in the intercoastal trade spend over 50 per cent of their time in port. Practically none of the cargo is handled in large units. Lumber is handled piece by piece and packages of other freight are handled package by package. Over 50 per cent of the fixed expenses, insurance, interest, wages, feeding crew, and other fixed expenses, accrue while the ships are in port.

The Coos Bay Lumber Co., operating lumber ships between Marshfield, Oreg. and Bay Point on San Francisco bay, has been able to reduce the time of ships in port and reduce handling costs by handling the lumber in large units which units are handled by shore cranes. Other lines are handling lumber in steel strapped units and find that the number of board feet handled in an hour is increased.

More transportation companies could adopt to advantage some of the methods that have reduced terminal time for railroads and motor trucks. Handling of freight has been reduced by increasing the size of the handling unit.

A carload of common brick in steel containers can be unloaded in less than one hour, compared with two days when the brick is shipped loose. Car utilization is increased four to one because the brick moves in units of 6000 bricks and because more tons of brick can be loaded on to a car. The handling unit has been increased from a wheelbarrow load of bricks to 6000 bricks.

The Great Western railway, England, uses containers up to four tons capacity. Small containers are used also to meet the needs of building in kindred trades. This container is seven feet seven inches long, four feet four and one half inches wide and one foot six and one half inches high, with a capacity of one ton ten CWT. Brick, tile, slate and stove work is handled into the upper floor of buildings in these containers and many handlings are eliminated with consequent reduction of costs and damage. A desire to reduce the weight of containers has led to experiments with welded containers. The Mt. Vernon Car Co. container and the small Church container are recent developments. The Church container can be loaded into ordinary type box cars.

The Church container can be used to handle freight under refrigeration by the use of frozen carbon dioxide. Experiments recently conducted in shipping refrigerated shipments were successful, the temperatures of the interior showing only a small drop in a trip of 450 miles. This container, because of its size and weight, may have very good possibilities in marine transportation.

Pier Contract Awarded

Announcement was made on Feb. 28 by Franklin D. Mooney, president of the Atlantic, Gulf & West Indies Steamship line, that contract for the construction of the new office building and pier shed of the Clyde-Mallory Steamship Co. on Pier 34, North river, had been awarded to Barbor-Comeau & Co. Inc. The price is in the neighborhood of $500,000 exclusive of plumbing, heating, lighting and interior finish.

The new pier, when completed, will be the largest single deck pier on Manhattan island. It will be 1024 feet long and 165 feet wide and will provide the Clyde-Mallory lines with three piers, 34, 36 and 37, North river. The new terminal is expected to be completed by about Nov. 1. The two-story office building will be 700 feet long and 50 feet wide.

Ship Makes Good Showing

Analysis of the performance of the Blue Funnel motor ship DEUCALION on a voyage of 4690 miles from Suez to Penang shows the voyage was made in 11 days, 19 hours and 34 minutes, at an average speed of 16.54 knots. The displacement of the vessel during the voyage was 11,999 tons and the mean average draft 22 feet 10½ inches. Total oil consumed was 435 tons, or 36.8 tons a day. Oil consumption per indicated horsepower per hour was 0.328 pound and oil consumption was 0.403 pound. Mechanical efficiency was put at 81.5 per cent. The vessel recently made a new record between Fremantle and Dunkirk at an average speed of 16.10 knots.

The directors of the Todd Shipyards Corp. at a monthly meeting declared a quarterly dividend of 50 cents per share, payable on March 21 to stockholders of record at close of business March 5.

Install Exhaust Turbine

The Ellerman line has recently given Messrs. Swan, Hunter & Wigham Richardson an order for the installation of the Bauer-Wach system of exhaust turbine in the CITY OF KHIOS and CITY OF BEDFORD. The output of the main engine of the CITY OF KHIOS before conversion was 2400 indicated horsepower, which will be raised by the addition of the exhaust turbine to 3120 total equivalent indicated horsepower, 990 of which will be developed by the turbine. The output of the propelling machinery of the CITY OF BEDFORD will be raised from 3500 to 4750 indicated horsepower, by the addition of a turbine.

These two vessels are the ninth and tenth respectively of the Ellerman line's fleet to be converted to the Bauer-Wach system, in addition to two new ships that have been equipped with this system when built.

Welding Society to Meet

The annual meeting of the American Welding society will be held on April 27 to 29 in the Engineering Societies building, 33 West Thirty-ninth street, New York. Among the papers scheduled that will be of particular interest to the marine field are the following:

Welding in the Construction of U. S. S. NEW ORLEANS by Capt. J. O. Gawne, U. S. N.; *Experimental Determination of Stresses in Fillet Welds* by L. C. Bibber, bureau of construction and repair, navy department; *Welded Barge Construction* by Gordon G. Holbrook, general superintendent, Federal Shipbuilding & Dry Dock Co.; *Welding Wrought Iron Pipe* by James Ashton, A. M. Byers & Co.; *Welding of Steam Pipe* by a representative of United Engineers & Constructors Inc.

The Sharples Specialty Co. was recently awarded a contract by the navy department to supply a centrifugal oil purifier for the new United States submarine V-8 to be named the U. S. S. CACHALET, building at Portsmouth navy yard, New Hampshire.

Packing for Export Shipment Undergoing Modification

By H. L. Stilwell

UP TO Feb. 1, 1930, export fibreboard cases shipped from the Pacific coast were subjected to a freight premium that restricted their use. That situation was the result of an erroneous impression that fibreboard cases did not have the strength to withstand the supposed extra hazards of ocean voyages. This belief was general, even though fibreboard shipping cases had been in use for a number of years in domestic trade, which imposed upon them conditions essentially the same as those they would experience in foreign shipment. For instance, there were shipments of millions of cases of pineapple from Hawaii.

The water distance from Honolulu to San Francisco is roughly, 2000 miles; whereas the water distance from New York to London is a little over 3000 miles—relatively not a great difference when riding in a ship is the chief concern.

Tested in Domestic Shipments

In addition to the approximate parity in the mileage factor, the Hawaiian pineapple shipments were subjected to extra handling. In order to reach the eastern market of the United States, they first came into San Francisco, were unloaded, then loaded again in an intercoastal vessel. This imposed at least two handlings after an initial voyage of 2000 miles, besides the first shiploading and stowage at the islands.

On board the intercoastal freighters, the fibreboard cases for domestic use then began a voyage which took them through the Panama canal, and the Caribbean, thence up the eastern coast to New York or some other port. This entailed a seajourney of from 16 to 20 days, only a few days short of a direct transatlantic voyage from Pacific coast ports to Europe.

Upon arrival, these fibreboard cases are of course unloaded, and then reloaded in freight cars for transshipment to inland points. Altogether they receive at least six to eight handlings, in addition to a water and land journey of over 8000 miles.

These repeated handlings provide a real test for any case; and fibreboard shipping cases have stood the strain, trip after trip, in splendid shape. Careful checkup has revealed a surprisingly small percentage of claims.

With other products, fibreboard shipping cases were also undergoing the tests of great distances and multiple handlings. Alaska salmon packers were sending their product to Seattle by water, and from Seattle many thousands of cases were being shipped to eastern ports such as New York. From Alaska to Seattle is about 2500 miles. From Seattle to New York is more than 7000 miles. In other words, the total mileage that these fibreboard cases traveled was more than 9000 miles. From Seattle to London, by direct water route, is only 8500 miles. Similarly, from San Francisco to London the direct route is only 7800 miles—or relatively little more than the distance covered by intercoastal steamers.

This was the situation in the American market, late in 1929. Domestic shipments in steadily growing number were being made safely in fibreboard cases, but their use in export shipments was virtually prohibitive by an excessive freight premium. Although fibreboard cases were being successfully applied to intercoastal domestic shipping, nevertheless old rules and outworn customs of the sea still insisted upon the necessity of using wooden boxes in foreign trade; and, therefore, two separate and entirely different operations of casing had to be maintained.

Suitable for Foreign Shipments

In order to cooperate with the shippers in their efforts to correct this situation, a number of test shipments of fibreboard cases (which require no wire ties or iron bands) were accepted by some steamship companies; and thorough analyses were made under actual conditions. Careful records were kept of the arrival conditions, as well as regarding the net savings made by fibreboard cases against wood, from the packing house to the European consignee.

Without exception, the shipments proved to steamship authorities, to underwriters, and to European buyers alike, that fibreboard cases were not only feasible but desirable. These test shipments resulted in the formation of the Export Fibreboard Case association, and the establishment of a standard of merit for members' cases used in exporting raisins and canned goods.

Since that time, export fibreboard shipping cases have left western American ports in increasing numbers, satisfactorily and economically delivering such products as raisins, canned fruits, fish, canned pineapple, etc.

Since it has been demonstrated that export fibreboard cases reduce landed costs at the foreign ports, it may be asked whether the buyer is the only one who receives the benefit of such reductions. Not according to one of the leading shipping executives on the Pacific coast. This man, who was among the first to recognize the possibilities of fibreboard cases for export shipment, summed up his conclusions as follows:

A Real Saving to Shipowner

"The two biggest causes of claims against a steamship company are pilferage and sweat. A cargo, passing through the cold waters of the Pacific, the warm currents of the Caribbean, then the frigid temperature of the Atlantic, plus atmospheric changes evident on the outside, is bound to be affected. Those conditions have been known to spot or rust cans, sometimes to foster a tinge of mold on dried fruits. We have found these tight and securely sealed export fibreboard cases particularly immune to such atmospheric changes.

"The other cause for claim, pilferage, is substantially lessened by fibreboard. When it is remembered that seldom are more than one or two cans taken from a case, it is readily seen how export fibreboard cases discourage such thievery. Once such a case has been opened, the condition is easily discovered. We have experienced a material decrease in our claims since we have used fibreboard in our export shipments."

Atmospheric conditions have no effect whatsoever upon the security of the seal of a fibreboard case. It requires a specialized bit of equipment to break open a fibreboard shipping case, and to re-seal it without detection. This insurance against pilferage has been most effective, in shipment after shipment.

With the progress which has already been made in perfecting cases specially designed and processed for heavy sea service, it is apparent that a new standard of efficiency, for exporting of such products as canned goods and dried fruits, is being established, as a typical and distinctive mark of American development in the science of export distribution.

The author, H. L. Stilwell, is managing director of the Export Fibreboard Association, San Francisco.

The Maryland Drydock Co., Baltimore, announces the installation of an additional section in its drydock No. 1, thus giving the following dimensions: Length over all, 508 feet; width inside at bottom, 80 feet 2 inches; capacity, 10,200 tons. The No. 2 drydock has a capacity of 9000 tons.

Useful Hints on Cargo Handling

CHECKING of special cargo, if it is worth anything at all, must be complete. Having the mate check from the crib to stevedore's truck and then leaving the cargo until it is trucked to the ship, is not complete protection.

The best method is to have the mate check the cargo into the locker, or special cargo space if a locker is not provided. If each case is numbered, loading can be handled without delay, as the mate can check from numbers and not from marks. Large lots of special cargo which are not placed in the crib, should be piled in regular piles so that they may be quickly and accurately checked. The watchman should have a book in which to record these lots, and records should be compared when changing shifts.

An elemental principle is that each member of an organization be told specifically what he is expected to do. Then there is no excuse for anyone not doing what he is supposed to do, and a great deal of lost motion and duplication of effort is avoided.

The president of a steamship company recently said: "Scientific management has been tried successfully in every business except the shipping business." There is no reason why it should not be tried and worked out successfully in this business.

Using Pie Plate Sling

ROLLS of kraft paper can be handled successfully by using the "pie-plate" sling. This is a circular platform 6½ feet in diameter, which is placed inside a net sling. The rolls are piled on end on the "pie-plate." As the falls are tightened the net closes around the load and prevents the load from falling from the "pie-plate." Rolls should be upended only, with protection of a bag of sawdust for the edge of the roll. Otherwise the edges are crimped and the consignee complains. If this method is followed in handling rolls of kraft paper, damage can be practically eliminated.

The McCormick Steamship Co. uses large platform slings for handling automobile tires. One hundred and twenty tires can be handled on a sling 6 by 9 feet as compared with 35 tires on the usual sized platform sling.

THIS page is being devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

The lack of a sufficient number of first-class men from the executive positions down to the foreman, make it necessary to develop organization mechanisms that will offset this lack.

A properly trained executive is always searching for the new. The average executive is repeating the same thing over and over again and is satisfied.

Efficiency of Truck Tires

THE following test of rubber tires for trucks and trailers gives some interesting information on comparative merits of steel wheels and modern rubber tires:

At "B" railroad warehouse. Tests observed by representatives of "B" railroad.

Preliminary data: Test made by Chatillon dynomometer on four wheel warehouse truck 3 x 6 feet, weighing 360 pounds empty. Payload 1540 pounds. Total weight 1900 pounds.

Steel wheels versus rubber tired wheels.

Tires—Goodyear special compound and special wheels.

Tire sizes, front 10 x 2½ inches; rear 18 x 3 inches.

		Draw Bar Pull			
		Steel wheels		Goodyear tires	
		Start	Maint'n	Start	Maint'n
Floor	Condition	Lbs.	Lbs.	Lbs.	Lbs.
Across wood block					
	Fairly smooth	51	38	25	18
2nd sec. wood block					
	Fairly smooth	82	27	26	20
3rd sec. wood block					
	Fairly smooth	50	30	40	25
Wood block					
	Dennison	56	45	42	27
Matched maple					
	Fair	37	32	28	24
Over wood	Sliver	150	....	130	....
To castor		95	....	70	....

All the above results are averages of three or more tests. In every instance rubber tired wheels show great superiority over trucks fitted with steel wheels.

A well known stevedore states that the most important thing of all is the personnel. His men like him and therefore he gets good results. Labor difficulties are frequently the result of mismanagement.

The most discouraging fact about the cargo handling problem—and at the same time the most encouraging—is that the job is never finished. No matter how thoroughly management keeps after the problem, there are always improvements to be made in the general or specific handling layout and perhaps smaller changes to be made at various points.

Belt Conveyor Used

NEW YORK & CUBA MAIL STEAMSHIP CO. uses a flat belt conveyor for discharging cargo of 100 pound bags of refined sugar from hatch coaming on lower tween deck, across skid to the wharf. This conveyor mounted on swivel casters is easily handled by two men for movement about the dock and across the skid that spans breasting-off of vessel. The capacity is from 1500 to 2000 pieces per hour.

Large platform slings holding about seventy pneumatic tires have been found to handle this class of cargo faster than rope slings.

One steamship line spends $12,000 a year for renewals and repairs of hatch covers. This will be reduced to about $2000 yearly when ships are fitted with hatch covers of an improved design.

Some executives have never systematically learned to think clearly. A trained executive overhauls his mind thoroughly to clear out prejudices and false impressions and get at the facts on which to found sound judgments.

Car wheels stowed with dunnage between each layer carry well. The dunnage keeps the wheels from sliding about.

Edward C. Plummer Dies In Washington

Colonel Edward C. Plummer, vice-chairman of the United States shipping board since 1923, and a leading authority on American shipping, died in Washington on March 20 at the age of 68. He had been seriously ill since Feb. 25, when he suffered a hemorrhage.

Mr. Plummer joined the shipping board in 1921 and his death is a great loss to the board. He was chairman of its committee on legislation and ocean mail contracts, trade routes and ship operations, and a member of its committee on claims, the interstate commerce commission and construction loans. Representing the fifth generation of shipbuilders in his family, he spent his youth in the shipyards near his home in Maine and had made a special study of American shipping all his life.

Colonel Plummer was born in Freeport, Me., and after graduating from Bowdoin college in 1887 became editor of a daily newspaper in Bath, Me., later purchasing a weekly. During his newspaper career he studied law and was admitted to the bar. He served as counsel for the Atlantic Carriers' association for 21 years.

In 1892 Mr. Plummer visited Europe to study shipping problems and shipyards and eventually became an authority on both subjects. At the outbreak of the Spanish-American war in 1898 he became a recruiting officer for the United States navy and raised a ship's company, which served on the monitor WYANDOTTE. Later that year he was a paymaster in the navy.

He represented the interests of the coastwise sailing fleet in Washington and brought about enactment of the law requiring that coastwise vessels be built by American labor. He also brought about abolition of the compulsory pilotage charges in the Virginia coal ports.

A number of sea stories and poems were written by Colonel Plummer and he had contemplated writing a history of Bath upon his retirement from the shipping board.

He is survived by his widow and three sisters.

Stricken While Lecturing

John T. Clancy, an executive of Worthington Pump & Machinery Corp., died suddenly of a heart attack March 9 while lecturing at the Engineers' club, New York, before a meeting of the American Society of Mechanical Engineers.

Mr. Clancy joined the Worthington corporation in 1919 and in 1923 became assistant manager of oil and gas engine sales, with headquarters at Buffalo, which position he held until his death. In July, 1931, his headquarters were moved to the Harrison, N. J., plant.

He is survived by his wife Mary F. Clancy. Interment was at Arlington Cemetery.

Announcement has been made that on and after April 1 the New York office of the Coen Co., combustion engineers, manufacturers of oil and gas burners, will be located at 30 Vesey street.

Joins Worthington Staff

Worthington Pump & Machinery Corp. has appointed Frank R. Wheeler special sales representative with headquarters at its Chicago office. He will cover the mid-west territory, assisting the Worthington organizations in Chicago, St. Paul, Kansas City, St. Louis and Detroit. Mr. Wheeler is well known for his work in connection with steam power plants.

Consolidate Purchasing

Announcement was made recently that effective March 21 the purchasing department of the Socony-Vacuum Corp., 26 Broadway, New York, would make purchases in behalf of Standard Oil Co. of New York Inc., Vacuum Oil Co. Inc., Socony-Vacuum Specialties Inc., and Standard-Vacuum Transportation Co.

The shipping board on March 23 granted approval to the American Diamond Lines Inc. to change the names of six of the 10 vessels which it recently purchased from the board. The vessels and their new names are as follows: CITY OF ALTON changed to BLACK GULL; COAHOMA COUNTY to BLACK TERN; SACANDAGA to BLACK HERON; SAC CITY to BLACK FALCON; SACO to BLACK HAWK and TOMALVA to BLACK EAGLE.

Rearrange Districts

McIntosh & Seymour Corp., Auburn, N. Y., announces a rearrangement of its eastern and New England sales districts. The former, comprising the states of New York, Pennsylvania, New Jersey and Connecticut, is now in charge of H. C. Lenfest, with headquarters at 30 Church street, New York, and the New England district, comprising the states of Massachusetts, Maine, New Hampshire, Vermont and Rhode Island, is in charge of F. C. MacKrell with headquarters also at 30 Church street.

Suitable Barge Terminal Urged at Chicago

A number of Chicago shipping interests are urging strongly that plans get under way for the construction of a suitable barge terminal there as a part of the Lakes-to-Gulf waterway. The waterway system is scheduled for completion and actual operation next year. It has been charged that Chicago, the leading beneficiary of the system, has not been diligent in making plans for the use of the waterway.

The Chicago regional port commission, the Chicago association of commerce and a number of other organizations have sponsored a bill authorizing this construction. The bill will go before the Illinois legislature which reconvenes on April 19.

The site for the barge terminal, chosen by the city engineers, is at South Damen avenue and the Chicago river. An expenditure of about $200,000 will be necessary to complete the improvements already made on the site. The funds are to be furnished, by agreement, by the Atchison, Topeka & Santa Fe and the Illinois Central railroads. Legislation, however, is held to be necessary, and this is being urged without delay.

The site includes deep water slips, docks, railroad sidings, a covered transfer platform and a modern concrete grain elevator of 1,000,000-bushel capacity. The last contract on the Illinois waterway, calling for a retaining wall at Joliet, Ill., will be let early in April, thus assuring completion of the project before next year. Plans are to finish actual construction work by about mid-October of this year.

This project completes the Illinois work in the Lakes-to-Gulf system, which was begun in 1908, when Illinois appropriated $20,000,000 for the work. After this sum had been exhausted and the Chicago sanitary district had spent $70,000,000 on its part of the waterway, the federal government took over the project with an appropriation of $7,500,000. the Illinois state government to provide bridges on the federal stretch of the improvement. It is expected that the waterway actually will be in use by 1933.

Since 1908 the barge terminal site, as it stands, has been used in handling most of the lake-rail traffic in Chicago.

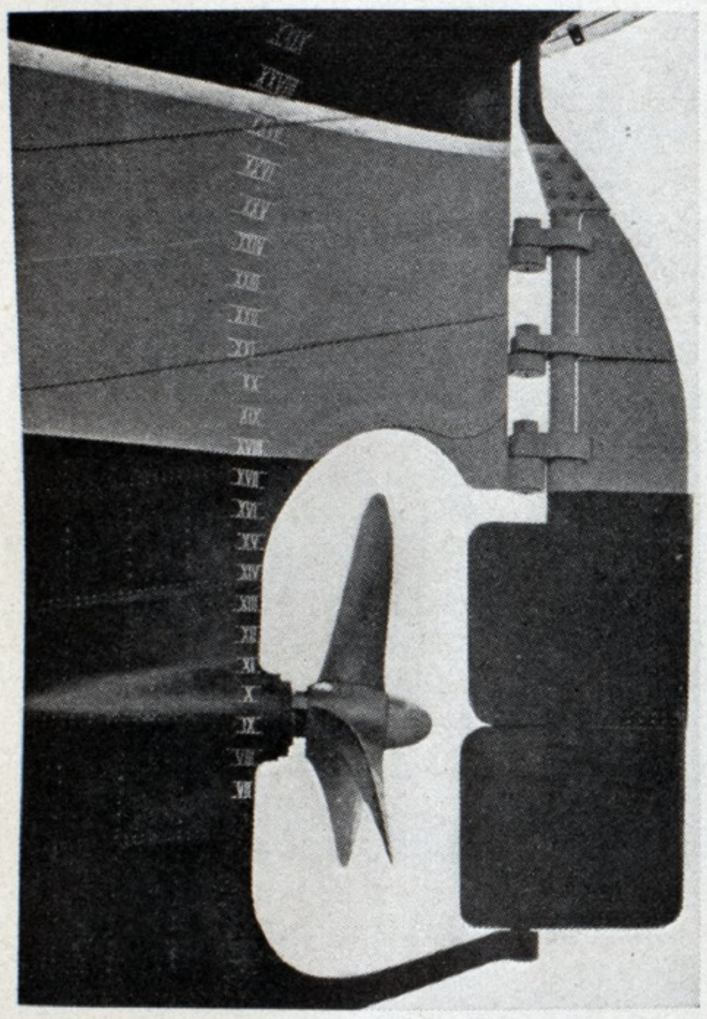
Will Equip New Ships

Each of the two new ships now under construction at the yard of the Newport News Shipbuilding & Dry Dock Co. for the Colombian Steamship Co. will be equipped with a Sharples centrifugal oil purifier to purify the turbine lubricating oil.

Equipment Used Afloat and Ashore

Rudder Streamlined and Fully Balanced—Complete Line of Digging and Handling Grab Buckets from 1½ to 16½ Cubic Yards

AMONG post war developments in ship propulsion has been the discovery that the dissipation of power abaft the screw is much greater than had been anticipated and several methods of recovering a portion of the lost energy are now available. The Balanced Reaction rudder, specially designed for new single screw vessels is not only streamlined and fully balanced but in addition derives a small auxiliary thrust or reaction from the rotation in the propeller slip stream. Owing to simplicity of design, the costs of construction and upkeep are low.



Balanced Reaction Rudder Fitted to Motorship Armadale

It is claimed by the manufacturer, the Balanced Reaction Rudder Co., 26 Fenchurch street, London, E. C. 3, England, that the rudder will effect an economy in fuel consumption of not less than 10 per cent, for a given speed, and that it will give an increase in speed of not less than four per cent on the same consumption. This claim is based on measured mile and service performances of every vessel fitted with the rudder. To date over 116 ships, aggregating over 652,000 deadweight tons, have been equipped with the rudder.

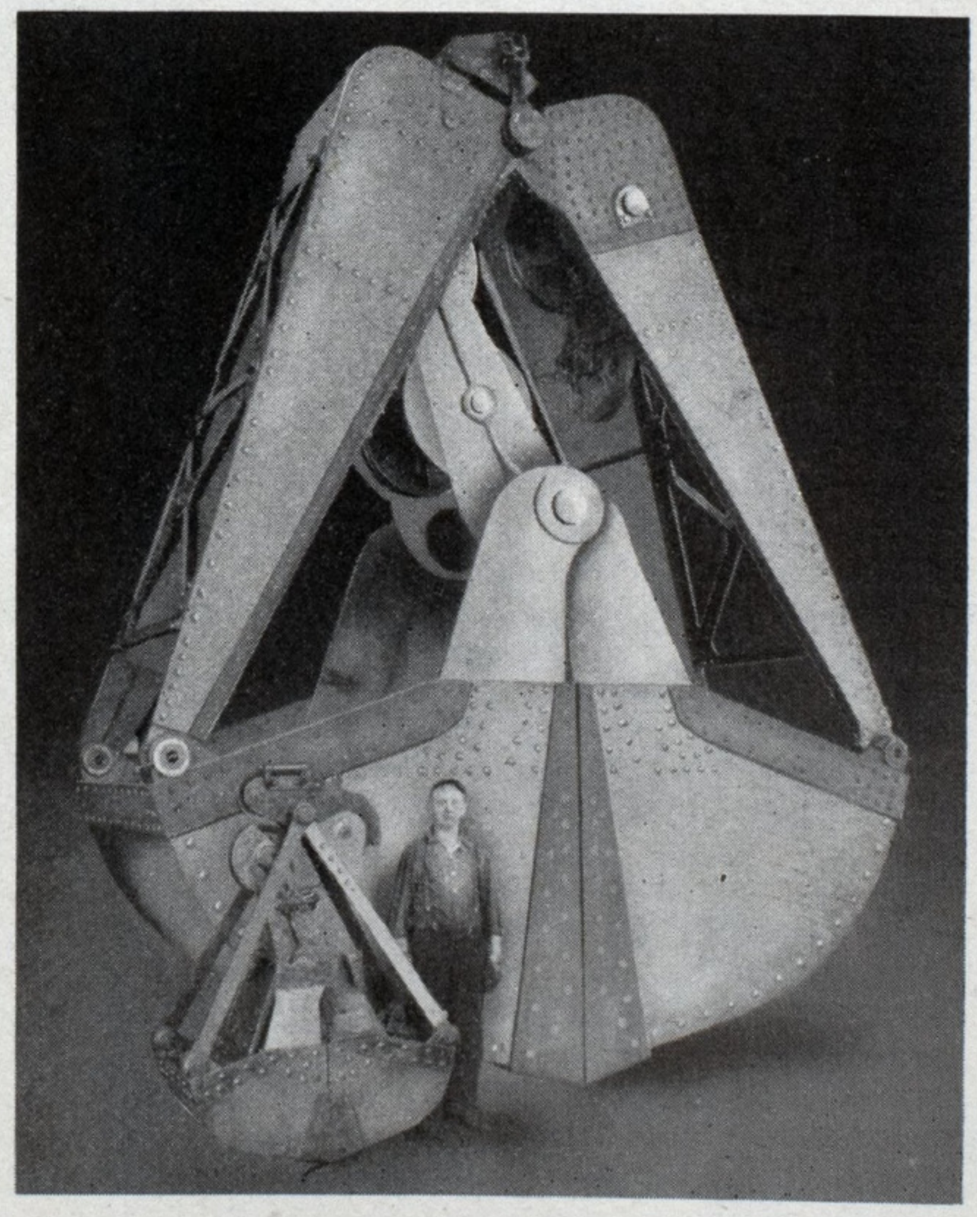
Either the single or double plate construction may be used, depending on the conditions of service involved. The open type of stern frame is used and the stresses on the rudder mainpiece are reduced to a minimum, the solepiece being strongly canted up and stiffened. The rudder is shipped and unshipped in the same way as the ordinary rudder. The propeller can be removed in the event of damage and a new propeller fitted without disturbing the tail shaft.

George B. Drake, 17 Battery place, New York, is agent for the United States Atlantic and Gulf coast districts. Branch offices are located at 664 North Michigan avenue, Chicago.

Buckets Produced in Wide Range of Sizes

WELLMAN ENGINEERING CO., Cleveland, which recently acquired the clam shell bucket business of the G. H. Williams Co., is producing a complete line of buckets from the very smallest to the largest and for every purpose. The range of sizes is shown in the accompanying illustration of a ½ cubic yard digging type alongside of the world's largest coal-handling grab bucket of 16½ cubic yards capacity.

Special buckets of the power-arm and multiple-rope types are built for unusual conditions such as wood and stone grapples, open-hearth cinder, limestone and slag. Single-line, hook-on, cableway, dragline, as well as the largest cleanup buckets for bridge-type cranes for handling coal or iron ore with spreads of scoops up to 24 feet are included in this line. Some of the outstanding features of construction of the standard buckets are: Large one-piece full width hinge which keeps the scoops in perfect alignment; rigid "A-frame" formed by rugged corner bars forged from a single steel billet with the bearing integral; extended corner brackets which bring the corner bar bearings out beyond the backs of the scoops adding extra leverage; narrowed head of cast steel and rolled steel plate for resisting the twisting strains of tough digging; the Williams tandem arrangement of power-arm sheaves giving a straight line closing pull, conserving the power for the digging, and the straight cable leads which reduce the cable costs; new type extra long roller rope guards and transverse roller protecting the cable by rollers on all sides reducing wear to a minimum; bronze bushings for all moving parts readily accessible and easy to remove.



Williams Digging Bucket of ½-Cubic Yard Capacity Contrasted with a 16½-Cubic Yard Coal-Handling Grab Bucket

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In the line of Lubrotite valves made by the Reading-Pratt & Cady Co. Inc., Bridgeport, Conn., a duct system is used for introducing a lubricant-seal between the seating surfaces, insuring tight seating at all times, even though seating surfaces have become scratched or badly injured in service. The seating surfaces are protected by a film of lubricant and will not corrode, scratch or become injured as easily as nonlubricated valves. The lubricant-seal separates the wedge from seats slightly, freeing the wedge that has become set for a long period of service. These valves may be used for replacement service without changing the pipe system in any way. All valves seat tight without the use of the lubricant-seal and can be so used.

Personal Sketches of Marine Men

Albert V. Moore, President, Moore & McCormack Co., Inc.

By E. C. Kreutzberg

Photo by Blank & Stoller Inc.

A SUCCESSFUL American steamship operator; he is the head of one of the largest fleets operating out of north of Hatteras ports.

HIS company has recently authorized the expenditure of over $1,300,000 in rebuilding four vessels for the American Scantic line.

HE HAS built up an efficient well rounded loyal organization which has gained the confidence and good will of shippers.

RECENT award, by Moore & McCormack Co. Inc., operating one of the largest fleets out of north of Hatteras ports, of a contract to the New York Shipbuilding Co. for rebuilding four vessels of the American Scantic line, at a total cost in excess of $1,300,000 with furnishings and equipment not supplied by the shipyard included, is a welcome aid in helping to maintain shipbuilding activity. Each ship will be equipped with cargo refrigeration and will accommodate 72 passengers in place of 16.

Albert V. Moore, president of Moore & McCormack Co. Inc., directs the operation of 36 ships in this and other lines. He has faith in the future of the American merchant marine, but is strongly of the opinion that the national attitude toward the tariff is harmful to maritime development.

"Our policy of building a high tariff barrier around ourselves," says Mr. Moore, "hamstrings the American merchant marine. Foreigners, as a rule, like to do business with Americans but they cannot trade with us under conditions which give them considerably less than an even break. It is to be hoped that when tariff legislation again comes up, the ship operators' point of view will be impressed on congress."

Born at Hackensack, N. J., Mr. Moore inherited his leaning to the sea from his father and his maternal grandfather. The latter was a sea captain who owned his ships outright and sailed them in the offshore trade. The father, Albert V. Moore, invested his surplus money in American ships, and at one time had an interest in thirty-five sailing vessels.

His connection with ocean shipping goes back to 1898 and a $4.00 a week job as office boy with Bowring and Archibald, New York. In 1903 Mr. Moore and M. Stanley Tweedie organized the Tweedie Trading Co. with Mr. Moore as secretary.

In 1913, with Emmett J. McCormack, he organized Moore & McCormack Co. Inc., accepted the agency of the Clinchfield Navigation Co., and thereupon developed a fleet of coal steamers. This fleet was handled almost until the end of the World war, and during that time the company negotiated for the Clinchfield line the building of a number of ships on the lakes for ocean service.

The first ship bought by Moore & McCormack Co. Inc. for its own account, during 1914, was an old wooden lake steamer called the GETTYSBURG, and about the same time the company also bought two wooden barges on the lakes. These three craft were converted for deep-sea work and caused their owner many a worry. As a result of this experience the company later advised the shipping board—when the wooden shipbuilding program was under contemplation—to build steel vessels only. The shipping board ignored this advice, but Moore & McCormack never again invested in a wooden vessel. During the war period the firm operated up to 65 vessels, a good many of them in submarine infested waters, without losing a single ship.

The company's owned and associated fleets now comprise twenty vessels; seven in the Mooremack Gulf lines trading between Boston and Philadelphia to Tampa, New Orleans and Mobile; eleven in the American Scantic line, trading between ports north of Cape Hatteras to Scandinavian and Baltic and Russian ports; and two in the Honolulu Steamship Co., mainly a tramp business. It also acts as freight agent for the Calmar line, owned by the Bethlehem Steel Corp., operating eleven steamers in the intercoastal trade. Five chartered vessels are operated to the East coast of South America.

Moore & McCormack Co. Inc. headquarters are at New York with offices at Boston, Philadelphia, Baltimore, Tampa, Mobile, New Orleans, Pittsburgh, Detroit, Chicago, Buenos Aires, Copenhagen, Helsingfors, Stockholm, Gydnia and Warsaw.

Mr. Moore is impressed with the high standard of education and training given at the United States Naval Academy. A number of men in his organization are graduates of Annapolis, and he expresses the hope that his two sons will seek to qualify for admission to this famous school.

He resides with his family at Forest Hills, Long Island. Golf is his principal diversion. He is a member of the Metropolitan, Whitehall and Lawyers clubs, of New York. When he has the opportunity, he goes deep-sea fishing.

Reviews of Late Books

Faraday and His Metallurgical Researches, by Sir Robert A Hadfield; cloth, 329 pages, 6 x 9½ inches; 68 plates, 12 illustrations and 27 tables; published by Chapman & Hall, London; distributed in America by the Penton Publishing Co., Cleveland; price, $6.50 postpaid.

From 1819 to 1824, before he had discovered the action of electromagnetic induction, Michael Faraday devoted much of his time to metallurgical research. Utilizing the primitive laboratory facilities of the Royal Institution at London and with the assistance of friendly steelmakers in Sheffield, he experimented with steel alloyed with nickel, silver, platinum, rhodium, iridum and osmium, palladium, titanium, chromium, copper, tin and gold.

Until recently comparatively little was known of this phase of Faraday's work. Fortunately, however, a box containing 79 specimens of his steel was discovered and turned over to Sir Robert A. Hadfield, who has examined them by the methods of modern scientific research. Using only a pound and a quarter of the precious material, Sir Robert made 493 chemical analyses and conducted chemical, physical and mechanical tests to the number of 866.

Out of the results of this unusual examination of century-old steels, Sir Robert has developed material for a book of absorbing interest. Entitled *Faraday and His Metallurgical Researches*, it not only throws light on an obscure part of Faraday's eventful life but also establishes the "Father of Electricity" as the rightful holder of the additional honor, "Pioneer of Alloy Steels."

In view of the author's own notable achievements in the discovery of alloy steels, it is easy to understand the enthusiasm with which he has delved into hidden nooks and crannies to unearth evidence of Faraday's researches. He traces Faraday's rise to fame, leaving no stone unturned in seeking out early acquaintances and associations that may have influenced the direction of the great scientist's search for knowledge. Thus he sets the stage for Faraday's exploits, and introduces a *dramatis personae* embracing such notable figures as Count Rumford, Sir Joseph Banks, William Haseldine Pepys, Sir Humphry Davy, and Dr. John Percy.

He reviews the earliest beginnings of metallurgy and traces its development up to the nineteenth century. After describing in great detail his examination of the historic specimens, Sir Robert then presents numerous appreciations of Faraday's work, concluding with his own judicial appraisal, which,needless to say, gives great credit to the subject of the book.

In conclusion, the author deals with more recent developments in alloy steels The book is intensely interesting from beginning to end. It is rich in historic incidents of significance in the world of science. It is illustrated profusely and contains many tables of data relating to the author's tests of Faraday's steels.

While Sir Robert set out primarily to establish Faraday as the first to engage in systematic research concerning the preparation of alloys of steel, his book goes far beyond that objective. It affords the reader a rich background for a better appreciation of the importance of genuine and successful research—the search for and discovery of fresh knowledge.

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130 *Years of Steam Navigation*, by Robert Dollar; leather, 138 pages, 9 x 6 inches; privately printed for the author by Schwabacher-Frey Co., San Francisco.

As conveyed by the title, this book deals with the development of the steamship and marine steam engine from their early beginnings up to the present day. In his foreword the author states that the book has been 20 years in the making and most of it was written at sea during voyages to various ports around the world. "It has been a pleasant task," continues Mr. Dollar, "organizing the material about a subject that has occupied my waking hours for so many years. Ships and shipping—an industry that is both romantic and practical, and therefore of absorbing interest to the layman as well as to the shipping man. The merchant vessel, trading across our oceans and bringing into closer relationship the peoples of the world, has done more for the advance of civilization than any other commercial factor. The story of the rise of present-day passenger and cargo steamship from their crude beginnings 130 years ago is a story of splendid accomplishment. During that period the genius and energy of countless men have gone into the task of creating more efficient ships."

While primarily an authentic history and filled with facts and figures on outstanding steamships of each era, the book contains many personal anecdotes and is interestingly written. The volume contains 28 fine illustrations of ships and models, all steam-driven, representing types from the CHARLOTTE DUNDAS, one of the earliest steam vessels, to the PRESIDENT HOOVER, the largest American merchant ship so far completed in the United States.

Since the book was privately published in a limited edition for presentation by the author, it is not on sale. Copies, however, may be found in the libraries, where they will serve as reference volumes.

Charles P. Wheeler, 75, a partner in the firm of Pickands, Mather & Co., Cleveland, and president of the former Pickands, Brown & Co., Chicago, died on Feb. 27 at Pasadena, Calif. He had been identified with the merchant pig iron, iron ore and coke business at Chicago for nearly 50 years.

New York Shipbuilding Co.

Report of the New York Shipbuilding Co. and subsidiaries for the year ended Dec. 31, 1931, shows net profit of $1,205,159, after depreciation, interest, taxes, etc. In 1930 the predecessor company, American Brown Boveri Electric Corp. and subsidiaries, report net profit of $1527. The company proposes to retire on vote of the stockholders at the annual meeting, 8490 shares of preferred stock, 42,756 shares of participating stock and 500 shares of founders stock, some of which was purchased after Dec. 31, 1931.

Liner Prepares for Season

When the United States liner LEVIATHAN sails from New York on April 26 on her first trip of the season to Plymouth, Cherbourg and Bremen, she will be in perfect condition throughout. The big steamer at present is being entirely overhauled and redecorated in every department. Special attention is being given to the third-class section of the ship. This section will be reserved for restricted third class on three voyages, June 28, July 19 and Aug. 9, when only passengers in the "white collar" class will be booked so that the space will be restricted to this class.

Early Lake Shipping

For the first time in many years, no large cargo vessels docked in Chicago during January or February, although the regular package line shipments on Lake Michigan and the other Great Lakes continued throughout the winter months.

The first vessel shipment of steel this season from Cleveland to Detroit was made during the first week in March on the steamer FELLOWCRAFT of the Nicholson-Erie-Dover Ferry Line, Detroit.

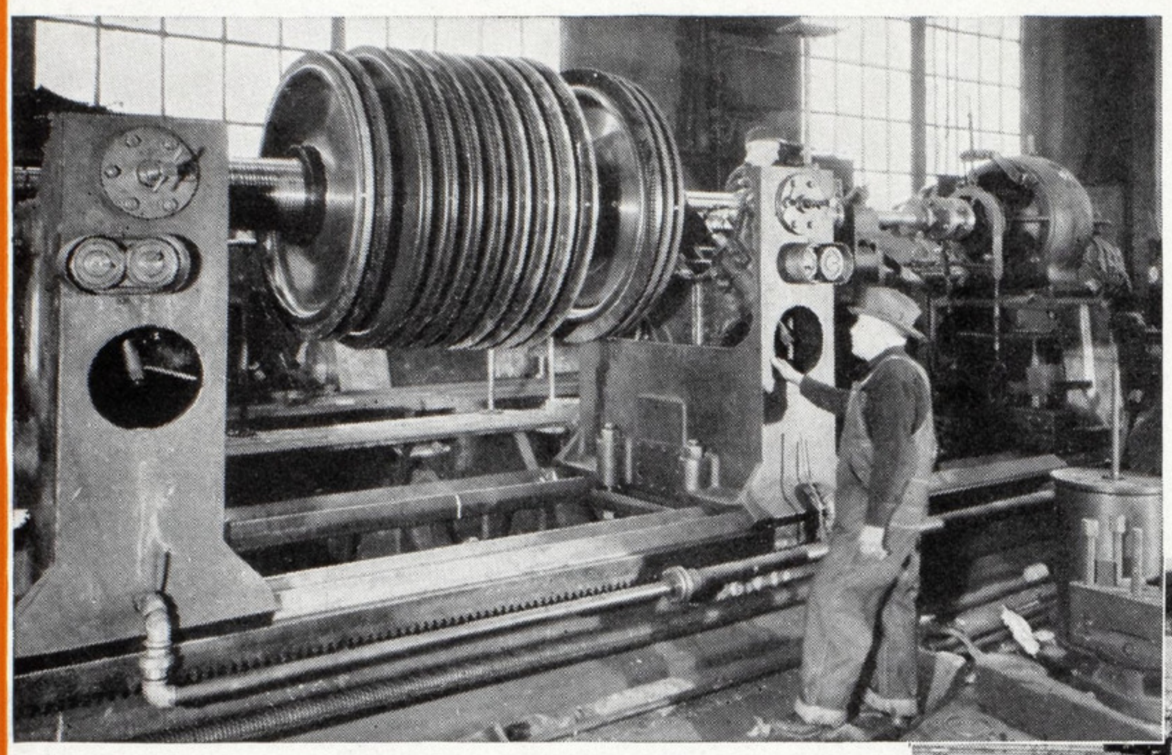
Iron and steel scrap interests in the Chicago area have collected a large amount of cast borings and other scrap at the docks of the East Chicago Dock Terminal Co., East Chicago, Ind., for movement by boat to eastern lake ports after the navigation season opens.

Marine Review

Reg. U.S. Pat. Off.

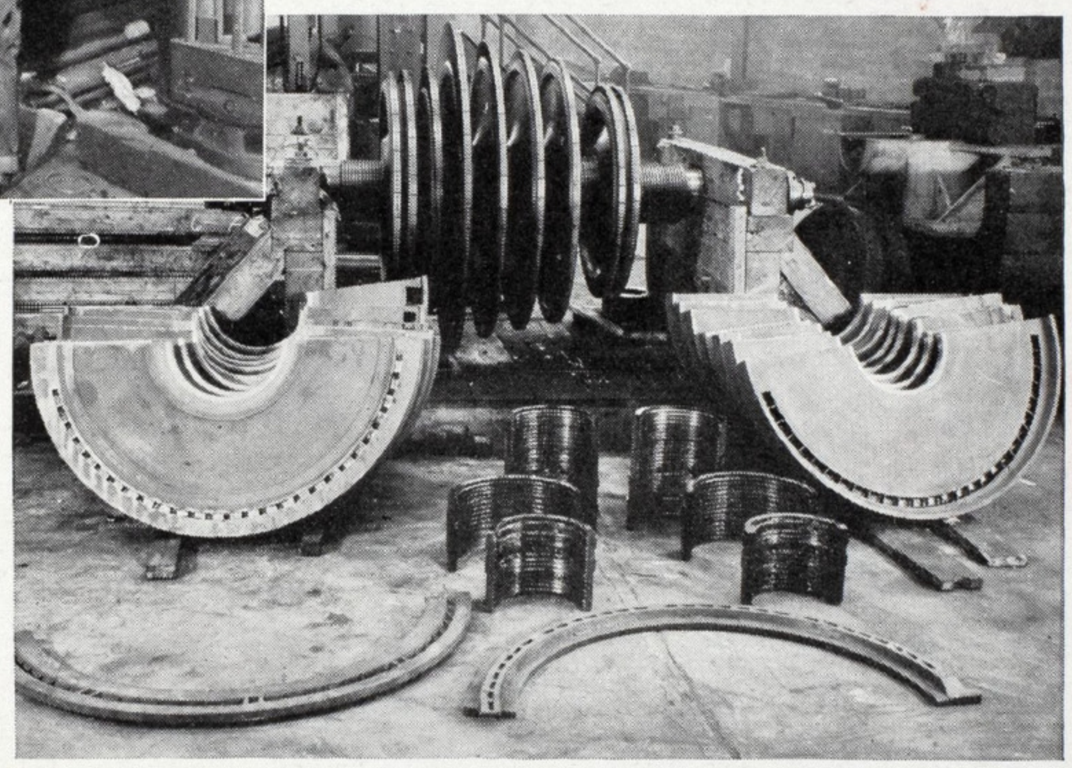
The National Publication Covering the Business of Transportation by Water

April, 1932



A complete set of H. P. Turbine Diaphragm Discs with labyrinth Sea Rings, Gland Seal Sleeves and diaphragm sleeve with labyrinth seal rings and nozzle blocks. Manufactured for a 4400 S. H. P. cross compound turbine.

In the background a 2500 S. H. P. Turbine Rotor which has been bladed and dynamically balanced.



The H. P. Turbine Rotor of a 4400 S. H. P. Cross Compound unit of the impulse type, in the dynamic balancing machine at the Robins Dry Dock & Repair Co., Plant.

Repairs to this rotor consist of checking rotor for truth, installing new gland seal and diaphragm labyrinth packing.

The installation of several rows of impulse blades, and machining of all rotor wheels.

Turbine Repairs

The modern equipment and vast facilities of Todd Shipyard units in Atlantic, Gulf and Pacific ports are proverbial of the Service rendered by this Organization.

An instance of this service is the 20-ton Balancing Machine located at the Robins Plant, at Erie Basin, New York, for the balancing of Turbine Rotors, together with full equipment for the manufacture of blading and complete stock of parts and accessories. Experienced, Todd-trained mechanics offer unexcelled service.

Todd Engineers are available at all times for consultation

TODD SHIPYARDS CORPORATION, *25 Broadway, New York*

PLANTS

Robins Dry Dock & Repair Co. *Erie Basin, Brooklyn, N. Y.*

Todd Dry Dock Engineering & Repair Corp. *Brooklyn, N. Y.*

Tietjen & Lang Dry Dock Co. *Hoboken, N. J.*

Todd Engineering Dry Dock & Repair Co. *New Orleans, La.*

Todd Shipbuilding & Dry Dock Co., Inc. *Mobile, Ala.*

Todd Dry Docks, Inc. *Harbor Island, Seattle, Wash.*

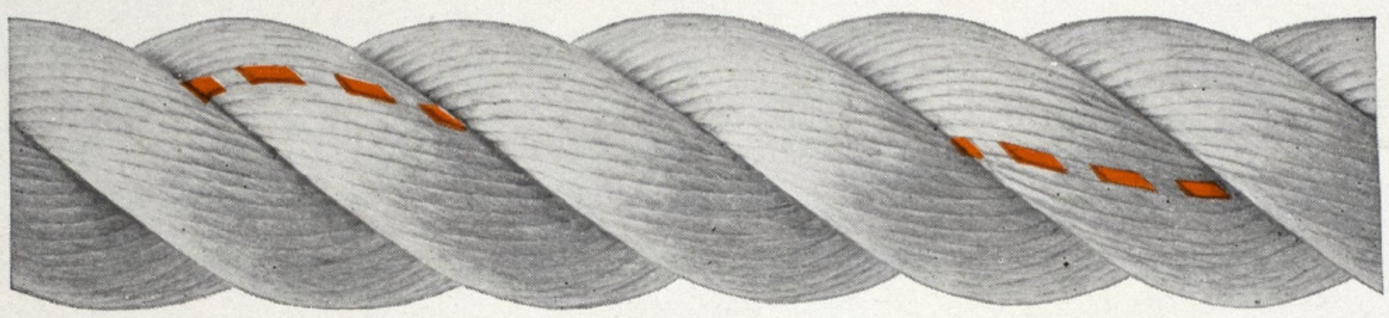
Todd Oil Burners, Ltd. *London, England*

24 Floating Dry Docks
2 Graving Docks 3 Shipways

LARGEST DRY DOCK in NEW YORK HARBOR

TODD NEW YORK, U.S.A.

The TwinYarn Permanently Identifies WHITLOCK WATERFLEX Manila Rope



FOR the protection of users of Whitlock WATERFLEX Manila Rope against substitution, the distinctive identifying marker illustrated above is used in all sizes 9/16 inch diameter and larger. A "fast-color" orange dye is used, and in addition to being readily visible, the marker is a component or working part of the rope itself. No amount of dirt, wear or water submersion can affect the permanence of this registered device; even in the case of a discolored or worn piece of rope the **TwinYarn** can be easily found.

In our patented FIBORE type of construction, the marker consists of an orange and black color combination. The **TwinYarn** registration, however, covers this double-yarn device whether used without color or with any combination of colors.

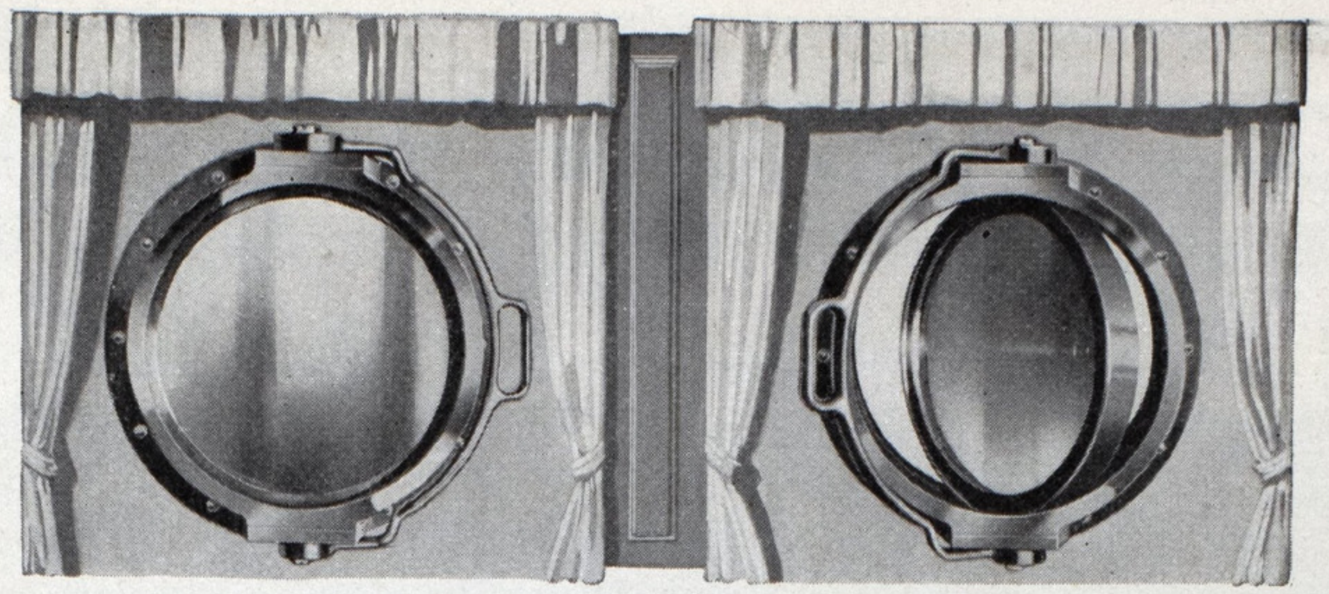
Whitlock WATERFLEX Manila Rope—FIBORE or all-yarn—offers many outstanding advantages at no additional cost.

WHITLOCK

WHITLOCK CORDAGE COMPANY

46 South Street, New York

Vol. 62, No. 4, Apr., 1932, issue of MARINE REVIEW, published month ly at Cleveland. O. Entered as second class matter at the post office, Cleveland, Ohio, under the act of March 3, 1879. Subscription price $3. 00 a year in U. S.; Canada, $4.00; Great Britain, £1; single copies, 35c.



CLOSED, LOCKED
AND WATERTIGHT

PARTLY OPEN
AND LOCKED

ANOTHER OUTSTANDING DEVELOPMENT!

THE "STIRRUP" TYPE PIVOTED SIDELIGHT

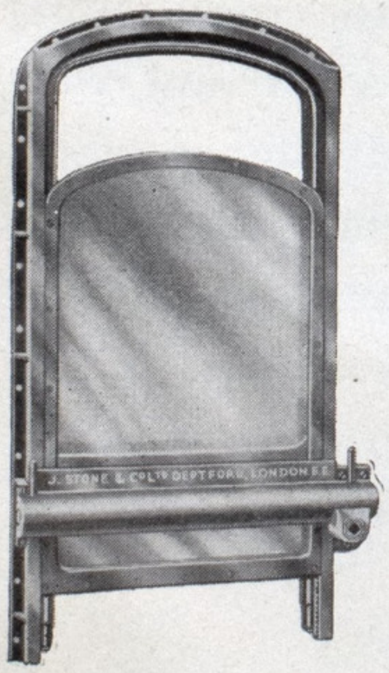
This latest development of Stone's will be installed on **4 Panama Mail Liners** built by Federal Shipbuilding and Dry Dock Co.

The "Stirrup" Sidelight and Deckhouse Windows (shown below) have been added to the list of Stone's products *manufactured and sold in this country* by **AMERICAN LOCOMOTIVE COMPANY.**

FEATURES OF THE "STIRRUP" TYPE PIVOTED SIDELIGHT

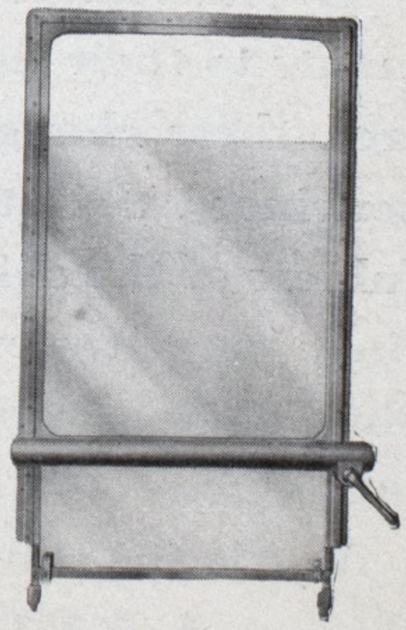
1. When closed, the greater the outside pressure the tighter becomes the joint between glass holder and its seat—a revolutionary feature in sidelight design.
2. No swing fastenings, draw-bolts, lugs or handscrews to bother with—a simple movement of the "stirrup" handle is all that is necessary to close, lock or open the light.
3. Can be locked in position for any desired amount of opening—acts as ventilator when partly open.
4. The ease and quickness of operation without possibility of spinning will appeal to passengers.

To be fitted on U. S. Liners Manhattan and sister ship built by N.Y. Shipbuilding Co.



WATERTIGHT TYPE
FOR EXPOSED
POSITIONS

Vertically Sliding Mechanically
Operated Rack and Pinion Type
Deckhouse Windows



WEATHERTIGHT TYPE
FOR LESS EXPOSED
POSITIONS

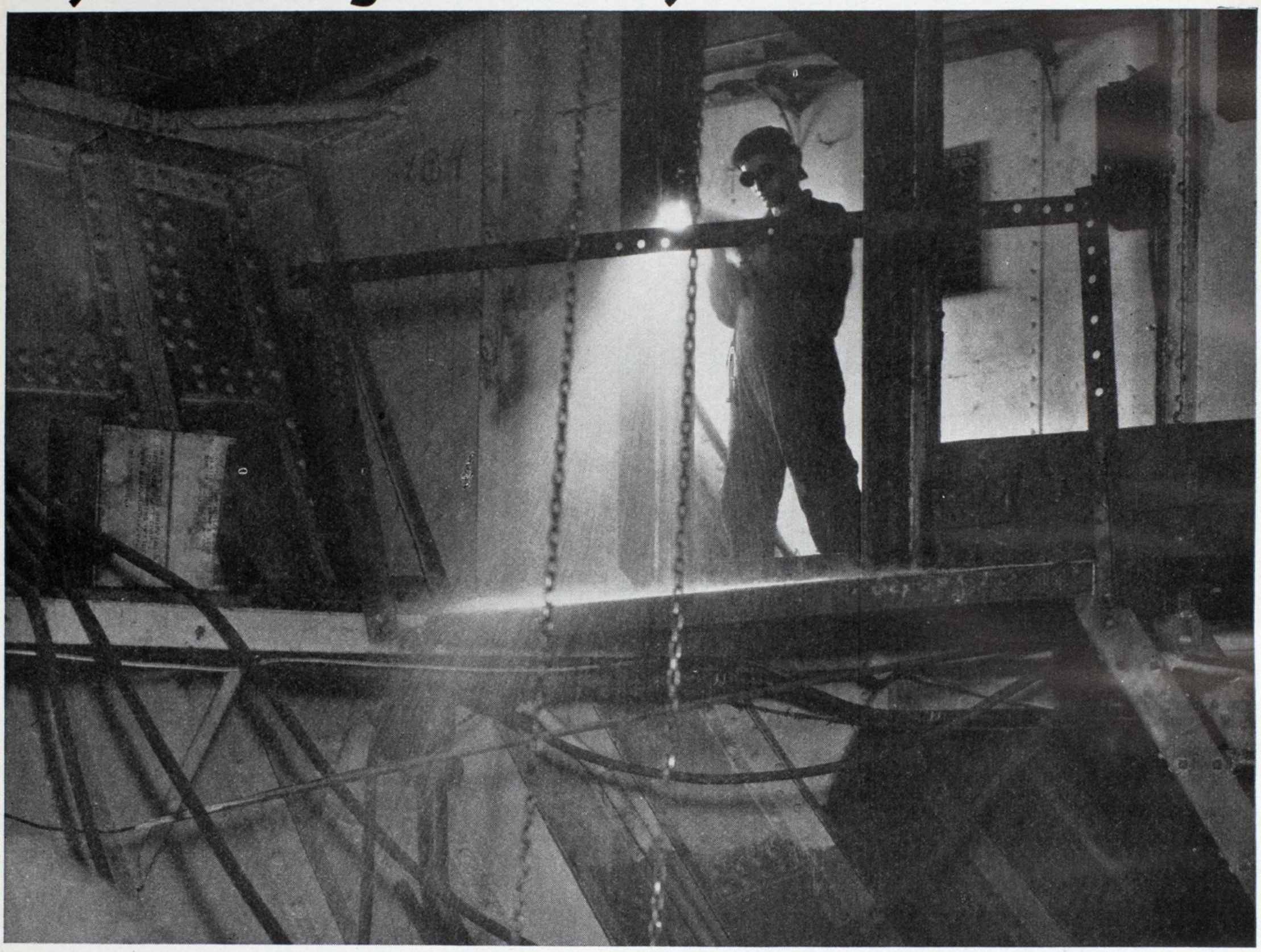
AMERICAN LOCOMOTIVE CO.

30 Church Street, New York, N. Y.

Rialto Building — San Francisco, Cal.

YOU'LL SAVE MONEY . . . .

by having us do your work now



MANY ship owners and operators have plans in mind for making improvements to their ships. They have considered these changes carefully. They are convinced that the efficiency and usefulness of the ships would be increased. But, "in view of present conditions," they have held off putting these plans into execution.

Now is the time to act. Have us make the alterations planned for your ships "sometime," *this Spring*. For now you can get the job done swiftly, dependably and economically. Materials and labor are both low at the present time. Tomorrow may tell another story. Take advantage of these conditions. Send us instructions for repairing or altering your ships now.

The AMERICAN SHIP BUILDING CO.

CLEVELAND	LORAIN	BUFFALO	SOUTH CHICAGO	SUPERIOR
American Ship Building Co.	*American Ship Building Co.*	*Buffalo Dry Dock Company*	*Chicago Ship Building Co.*	*Superior Shipbuilding Co.*

PROMPT AND EFFICIENT REPAIR SERVICE AT BETHLEHEM'S BALTIMORE PLANT

Above: Former Diesel-Electric Oil Tanker Brilliant. This vessel, sunk as the result of an explosion and fire, was reconditioned and converted at Bethlehem's Baltimore Plant to an oil barge for the Bouchard Transportation Company.

At right: S. S. Garnet Hulings in 580-ft. graving dock at the Upper Yard of Baltimore Dry Docks Works, Baltimore Plant.

BETHLEHEM Shipbuilding Corporation's Baltimore Plant offers to shipowners and operators unusually complete, convenient and modern facilities for handling any kind of a ship repair or overhauling job promptly, efficiently and at reasonable cost for the service rendered.

The facilities of Baltimore Plant include:—

Ample docking facilities, consisting of two floating dry docks, one of 20,000 tons and one of 6,000 tons; two graving docks, 614 ft. and 469 ft., respectively; and roomy pier and berthing space.

Modern, well-lighted buildings with 88,000 sq. ft. of floor space, housing shops and equipment for handling any kind of ship repair work, regardless of its character, including the making and assembling of repair parts.

Excellent crane service on all piers for the speedy handling of materials and equipment.

Special conveniences to expedite work, such as Wheeler tank cleaning barge; plenty of electrical outlets on piers; air, steam and water lines of ample capacity, to all points; and exceptionally good lighting for night work.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

General Offices: **BETHLEHEM, PA.**

General Sales Offices: New York, 25 Broadway; San Francisco, 20th & Illinois Sts.
District Offices: Boston, Baltimore, San Pedro

★ BETHLEHEM ★

EFCA Cases Handle Easier; Occupy Less Space

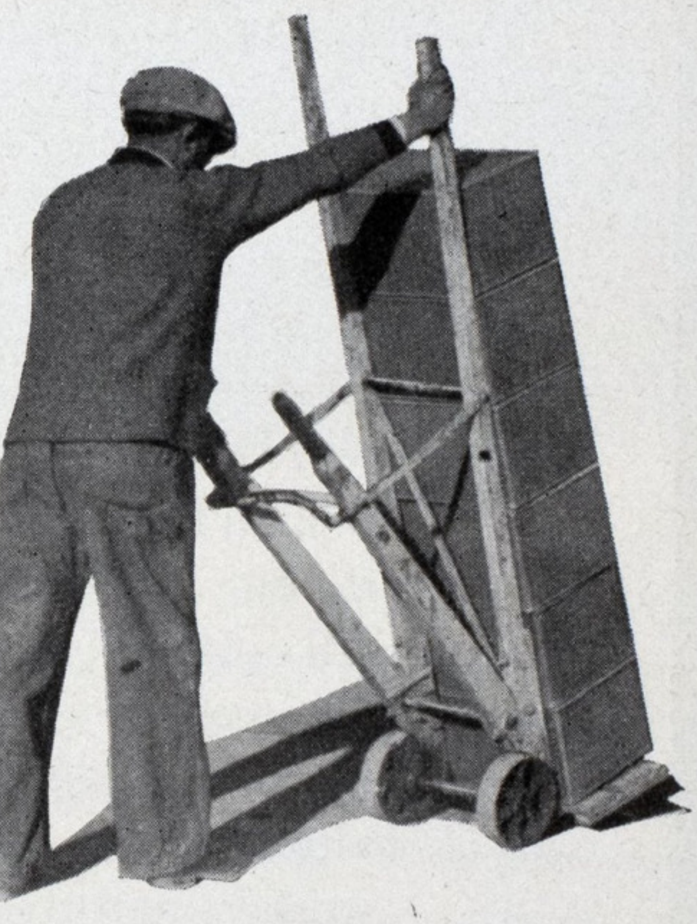
EFCA SERVICE

Assists Warehousing . . .

The complete chain of Efca service begins before the export fibreboard shipping case has been manufactured and ends only when it has reached the retailer safely. Every phase of the journey from plant to receiver is carefully serviced—Efca's aim being to insure that every buyer, shipper, steamship operator, warehouse man and stevedore knows how to handle Efca fibreboard cases properly.

In warehousing, this service has manifested itself in easier and safer handling methods. The warehouse man has been quick to realize fibreboard cases stack more simply and economically; that they present no rough edges or wires to injure the hands of handlers; that they increase the capacity of warehouses.

Thus, in all phases of exporting the Export Fibreboard Case Association is co-operating to increase international trade. No other group of container manufacturers offers such a service.



Specify Efca Cases

Export Fibreboard Case Association

An International Association of Leading Fibreboard Case Manufacturers

MEMBERS' MILLS AND FACTORIES

Antioch - Chicago - Delair - Honolulu Kahului - Los Angeles - Milwaukee - New Orleans - New York - Oakland - Philadelphia - Port Angeles - Port Townsend - Purfleet, Essex (England) - San Francisco Seattle - Southgate - Stockton - Sumner Sydney (Australia) - Three Rivers - Vernon White Pigeon

A MILLION *new customers for the price of* ONE

GET this straight—it isn't theory—One million workers are now going back to work—

Common sense dictates a stimulation of employment in every industry to end depression everywhere.

Filling one million pay envelopes with cash money, to be spent for groceries, clothes and other necessities is going to make business better. One million families will have money to buy whatever you have to sell—It will make it necessary for retailers, wholesalers, manufacturers, bankers and transportation systems, etc., to add other workers to their payrolls to take care of increased business.

The plan is simply a matter of reversing the depression. When people stop earning they stop buying your goods—When you take back a worker you will be needing others.

This opportunity to end unemployment and get back to better times is suggested to millions of employers. Will you, Mr. Employer, rise to the emergency and aid as you have in the past?

Must we plead further—or urge and argue, when the necessity is so great for action and the advantages so obvious? What will your business be worth if we fail to pull together?

So here's your small bit—Put on your payroll at least one unemployed worker—Now—We are trying to get 999,999 other employers to do the same.

WAR AGAINST DEPRESSION CAMPAIGN

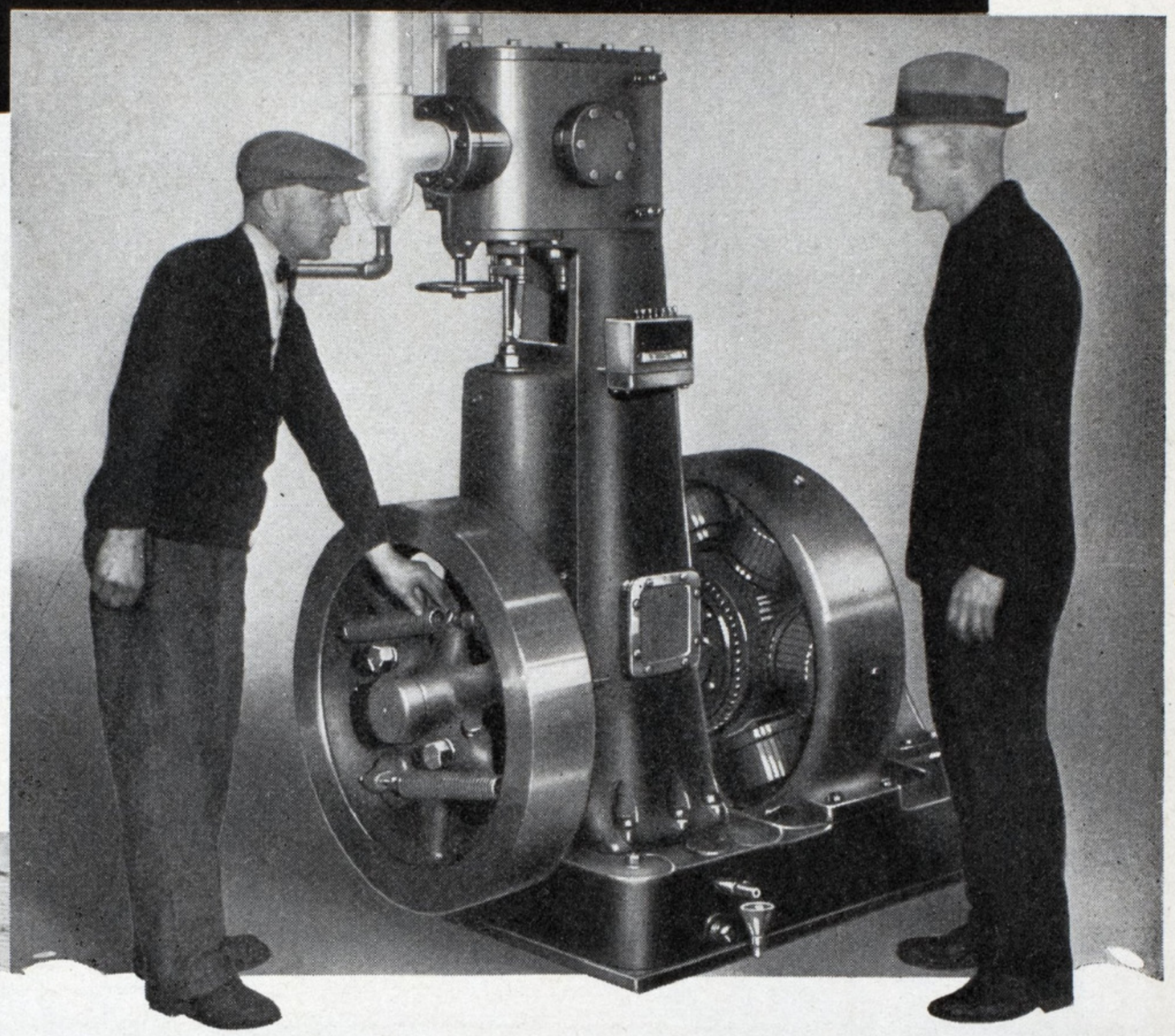
UNITED ACTION FOR EMPLOYMENT

Sponsored by

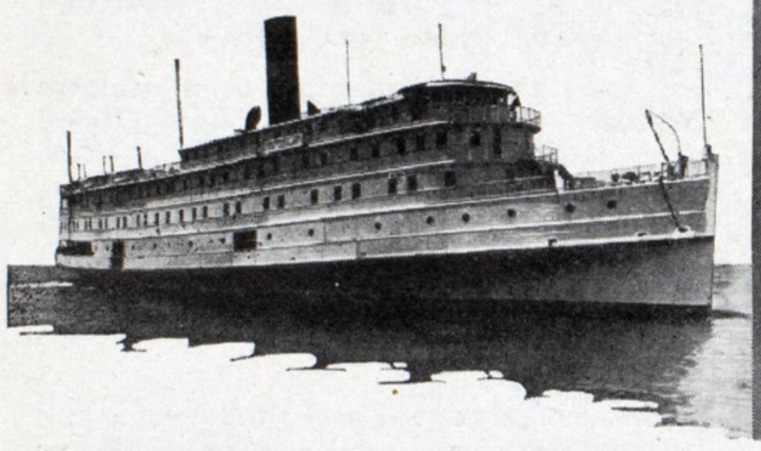
The American Legion
American Federation of Labor
Association of National Advertisers
The American Legion Auxiliary

This space donated by Sperry Gyroscope Co., Inc., Brooklyn, N. Y.

OUR VOLTAGE is Constant!



STEAMER YORKTOWN
equipped with Troy-Engberg generating sets. Built by Newport News Shipbuilding & Dry Dock Co. for Chesapeake Steamship Co.



CONSTANT VOLTAGE . . . assures steady lights, proper gyroscopic compass performance and is a distinct asset and convenience to every ship. Troy-Engberg generating sets are equipped with a simple, automatic, positive acting governor which gives excellent speed control and maintains constant voltage under all load changes.

This is but one of the many refinements that have caused Troy-Engberg steam engine generating sets to be acknowledged superior equipment.

The low *maintained* steam rate of these sets cuts cost and keeps them down. Their generous design, self-oiling features, operation without oil leakage, and the high grade materials that go into their construction guarantee a long life and dependable, trouble-free operation.

Valuable data on these Marine generating sets is available to you for the asking. Write us for it.

TROY ENGINE & MACHINE COMPANY

2248 Railroad Ave., Troy, Pennsylvania

TROY-ENGBERG

MARINE GENERATING SETS, DC OR AC • GENERATORS • STEAM ENGINES

M-32-2

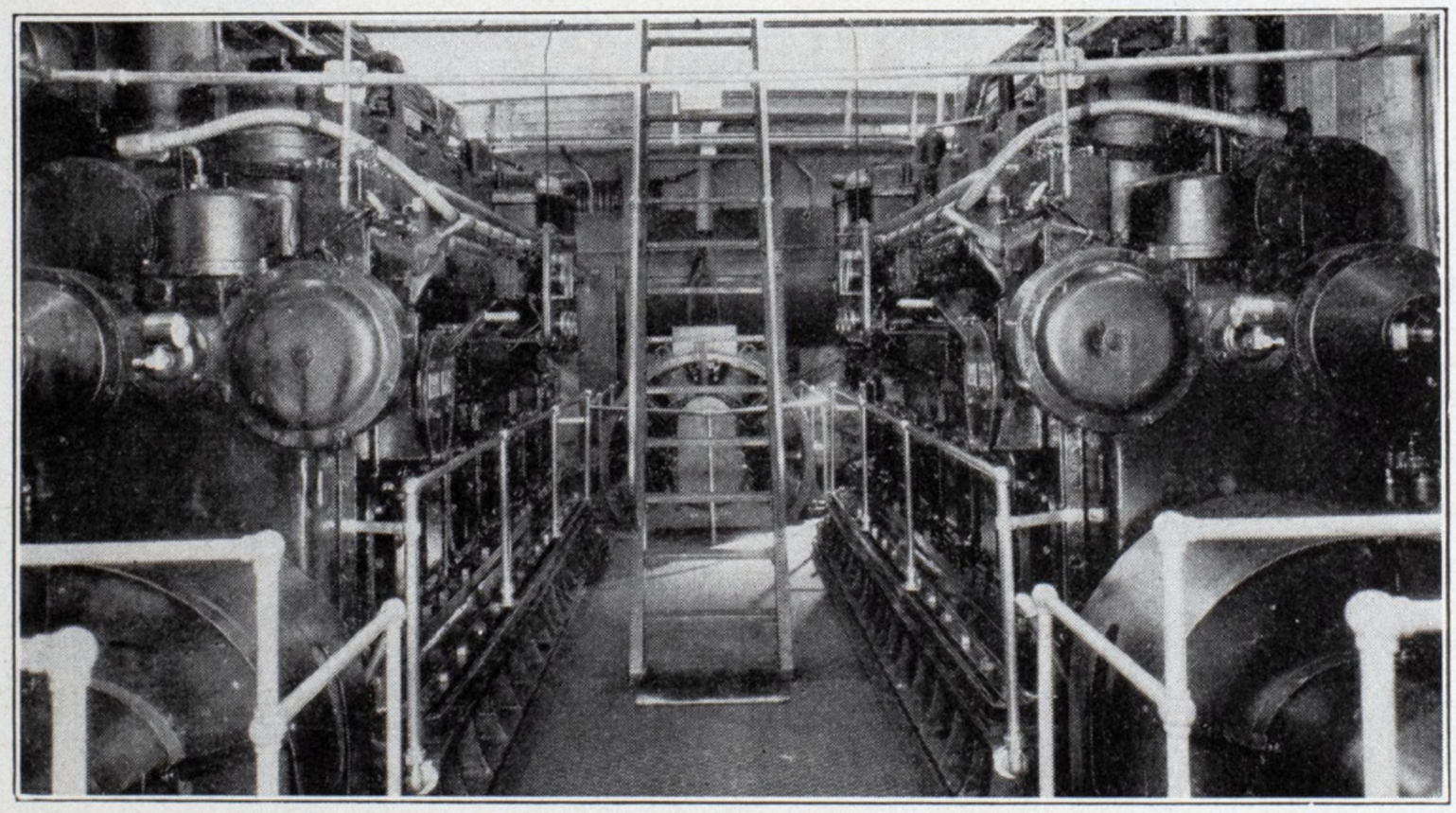
New 100-ft. tug "Walter Wyman" is "Queen of the Quarantine Fleet"

Utmost reliability and readiness to go into action at a moment's notice under all conditions, are the rigid requirements of equipment used in the Quarantine Division of the U. S. Public Health Service. This service operates about 75 vessels—approximately 30 of which are Diesel propelled—and many of them with F-M Diesel Engines

The degree of satisfaction that F-M Diesel units have given in the Quarantine Service is evidenced by the fact that the new 100-foot boarding tug just completed, one of the most powerful tugs of the entire fleet, is Diesel-electric driven by two F-M 325-hp. Diesel engines. This tug is also equipped with F-M Diesel auxiliary units (see below).

This preference for F-M Diesel Engines for a marine service is not difficult to understand. F-M Diesel Engines are *simple* . . in design and in construction. This simplicity demonstrates its value to owners in the unequalled degree with which F-M Diesel Engines meet the five fundamental requirements of Diesel power: (1) Unusual fuel economy; (2) Low labor cost of operation; (3) Low maintenance cost; (4) Utmost reliability; (5) Long life.

Before you buy a Diesel engine—of *any make*—get the complete story of Fairbanks-Morse Diesels. The services of a Fairbanks-Morse engineer are at your disposal for consultation on power problems. Literature mailed promptly on request.



Shown here are the two, 325 HP Model 37 F-M Diesel engines, in the new 100-foot tug recently completed for the Quarantine fleet, by the Spedden Ship Building Corpn. of Baltimore. Besides the main propulsion machinery, the engine room also contains an auxiliary F-M air compressor-generator unit, consisting of 30-hp, F-M Diesel, direct connected to a 20 kw. 110 volt generator, and clutch connected to a 50 c.f.m. air compressor. A Fairbanks-Morse fire and bilge pump is also part of the engine room equipment.

FAIRBANKS, MORSE & CO.

New York: 160 Varick Street
Baltimore: 115 East Lombard Street
Boston: 88 High Street
New Orleans: 100 St. Charles Street
Jacksonville: 650 West Bay Street

General Offices: Chicago

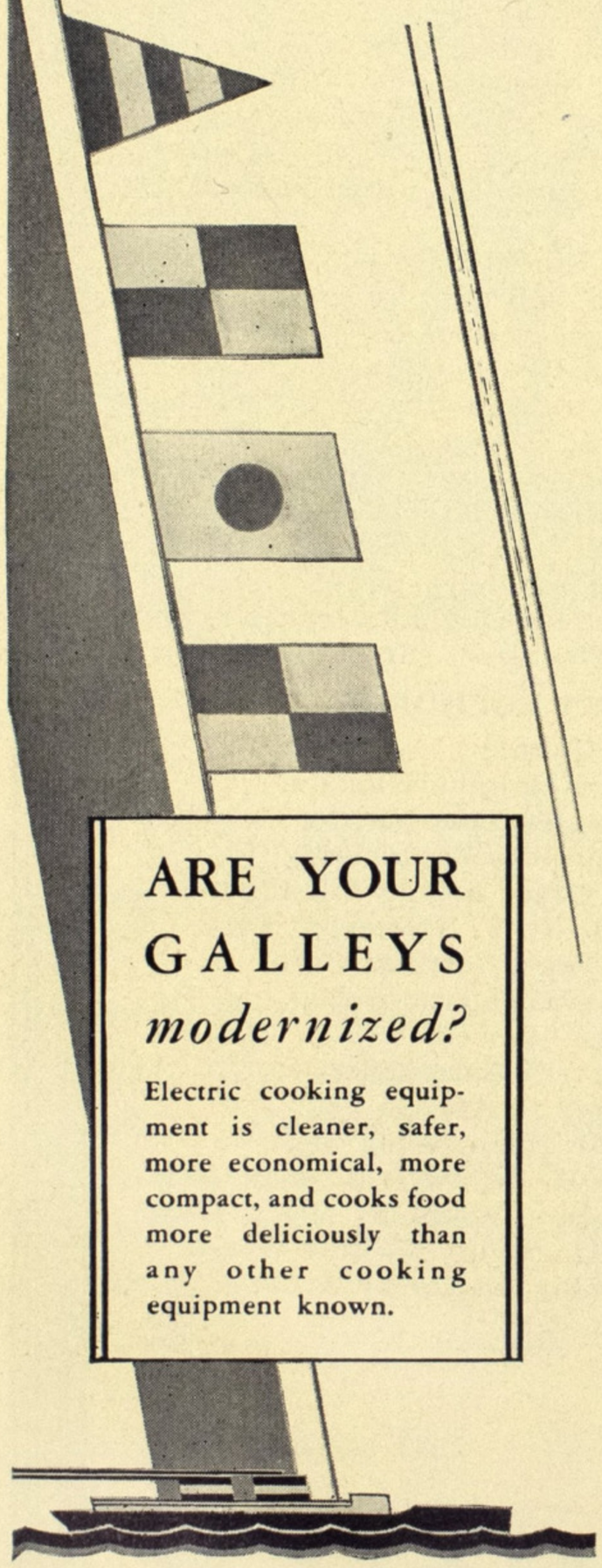
Branches with Service Stations in Principal Ports

FAIRBANKS-MORSE diesel engines

8 TO 1400 HORSEPOWER

5661-OA27.394

The galley on the S.S. Mariposa is equipped with 10 Westinghouse Electric Ranges and two three-section Bake Ovens.



ARE YOUR GALLEYS *modernized?*

Electric cooking equipment is cleaner, safer, more economical, more compact, and cooks food more deliciously than any other cooking equipment known.

ELECTRIC RANGES *and* OVENS *that have proved their "sea legs"...*

FOR years Westinghouse electric galley equipment has been going to sea. These ranges, ovens, fry kettles, broilers and other cooking units which have been designed for unusually heavy duty service are hardy, all-weather hands—they have proved their "sea legs."

For example let us point out the unusually rugged construction of the Westinghouse galley range with its angle-iron welded frame which supports the cooking surface, oven and control equipment. The top of this range is so constructed that it will carry a dead load of 1500 pounds while at red heat without buckling, warping, or sagging. A special type of construction, exclusive with Westinghouse, allows free expansion and contraction of the units supporting the framework while heating and cooling.

Another exclusive feature is in the oven construction which provides inner walls of heavy stainless steel reinforced with steel angles. The outer shell of heavy rust-resisting steel is separated from the oven lining by 3 inches of rock wool insulation. Positive and reliable heat control of the oven insures perfect results day after day.

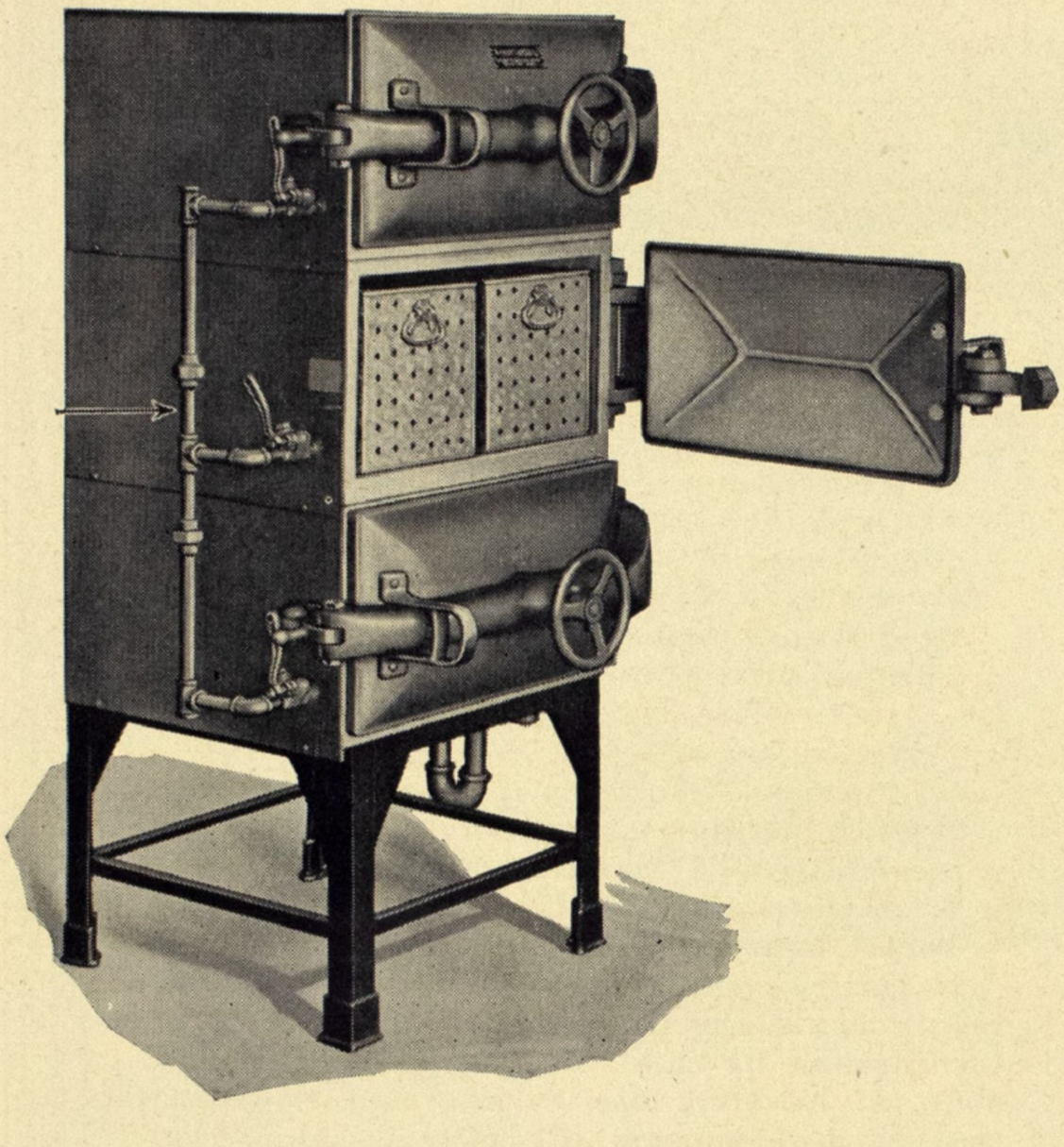
Let our representatives help you with your galley equipment problem. Our nearest district office will be pleased to cooperate.

Westinghouse

T 79057

Quality workmanship guarantees every Westinghouse product

The Great White Fleet . . . . . .



Equipped with CHEF-LINE *Marine Type Galley* STEAM COOKERS

Travelers of today are not compelled to take any kind of ship—for any kind of voyage. They book passage on ships that offer the maximum in comfort and pleasure.

The Marine type CHEF-LINE Steam Cooker now being included in the galley equipment of many fine ships, is the most modern of cooking appliances. Especially designed to meet the conditions of marine service, this unit makes possible results which will please the most fastidious patron.

CHEF-LINE Steam Cookers are highly efficient. They are carefully designed and substantially constructed. Operation is positive and safe. Construction is available partially or wholly in stainless metals. We shall be glad to furnish you promptly with complete information and quotations, and give name of your nearest galley equipment dealer.

. . Distinctive users of CHEF-LINE FOOD SERVICE EQUIPMENT STEAM COOKERS

United Fruit Company
Dollar Steamship Lines
Matson Navigation Company
New York & Cuba Mail S. S. Co.
Newport News Shipbuilding & D. D. Co.
Bethlehem Shipbuilding Corp. Ltd.
Todd Shipyards Inc.

CHEF-LINE FOOD SERVICE EQUIPMENT

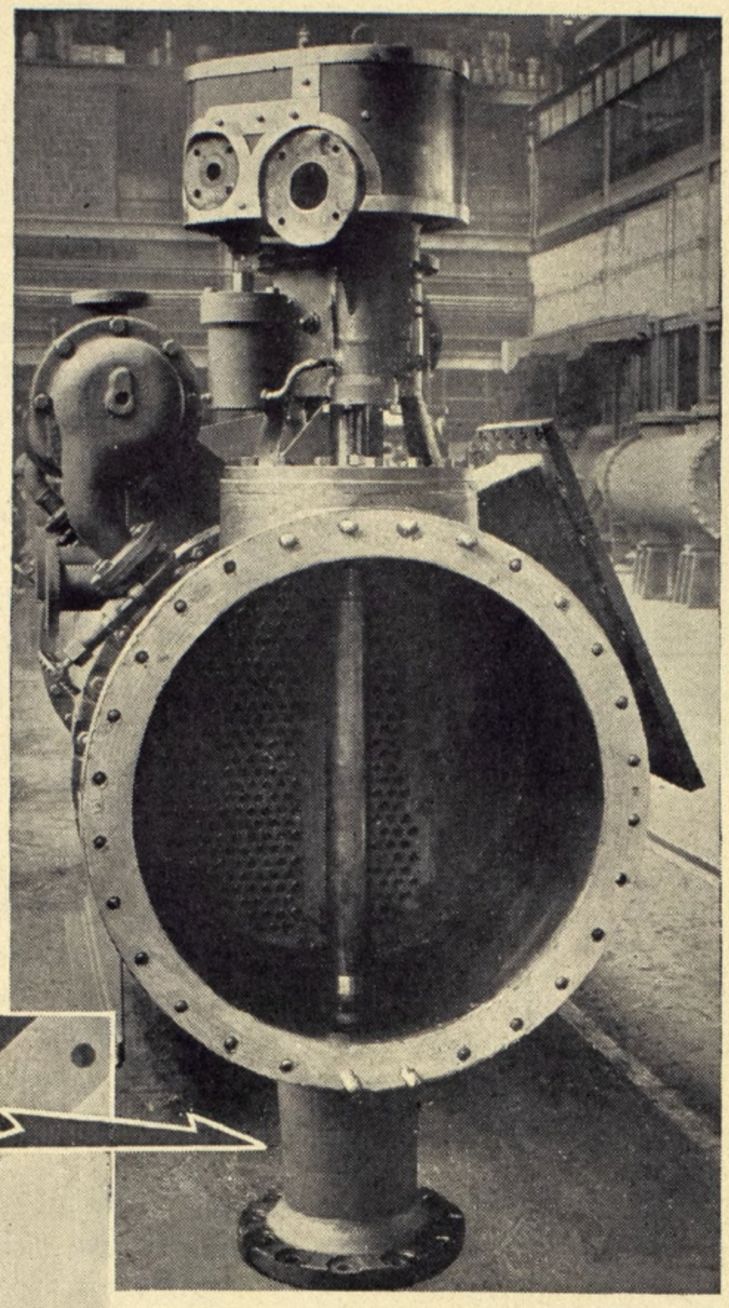
The Cleveland Range Company

General Offices—519 Huron Road, Cleveland, Ohio

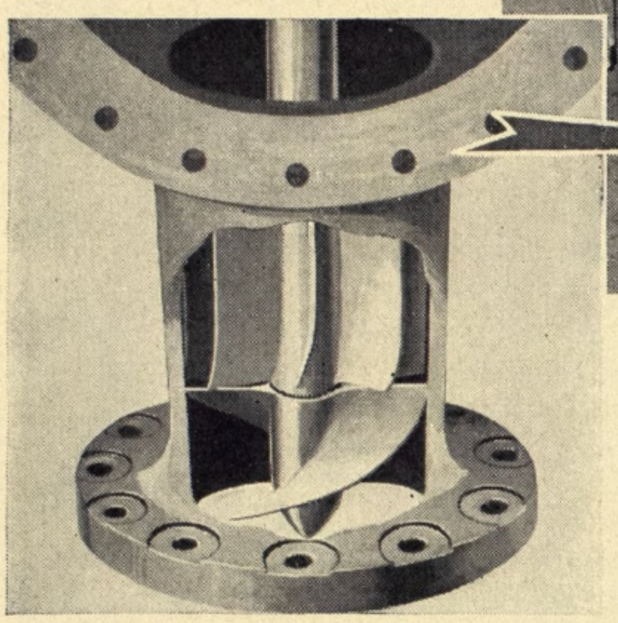
The BUILT-IN Circulating Pump

means

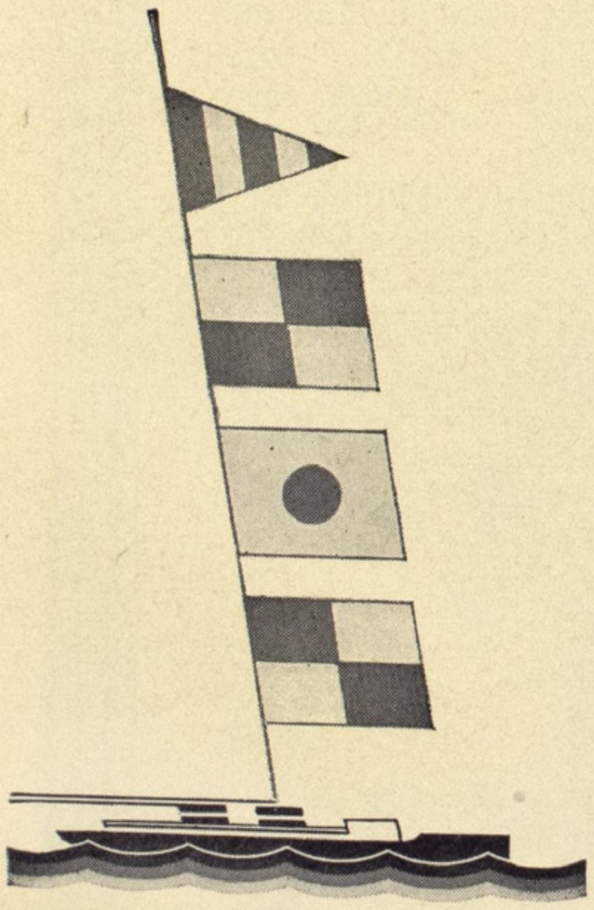
Condenser Economy



Right—A 520 sq. ft. simplified Westinghouse Marine Condenser showing the water box and the position of the propeller pump. The turbine which drives the pump is at the top.



Left—The propeller pump showing guide vanes and propeller.



IN the new Westinghouse simplified condenser for tugs, yachts, ferries, and small cargo vessels, a propeller-type circulating pump is built into the water box. This compact construction simplifies pipe shapes, reduces the amount of piping, the number of joints and turns, the resistance to water flow, and the amount of power absorbed by the pump.

It makes available for other purposes space which is ordinarily occupied by the circulating pump.

It saves weight, its maintenance charges are low, and it is designed to give long years of efficient service.

Complete details of this compact and economical condenser unit will be furnished upon request by our nearest district office.

T 79065 **Westinghouse**

Quality workmanship guarantees every Westinghouse product

FRIGIDAIRE AUTOMATIC REFRIGERATION

Selected for the

"New York Socony"

The "New York Socony," latest of the Vacuum Socony Transportation Company tankers, is Frigidaire-equipped.

Frigidaire equipment provides completely automatic refrigeration. It is care-free...trouble-free. No attention is required. It assures you of dependable refrigeration for years. No matter what the climate, Frigidaire keeps foods fresh and wholesome. The mechanism is very compact, accessible and specially engineered to provide extra power for unusual requirements.

And in every port—either foreign or domestic—there's a Frigidaire representative. Should you need new equipment or any sort of inspection or adjustments, the local Frigidaire office will promptly attend to your needs.

● *The new tanker "New York Socony" is Frigidaire-equipped.*

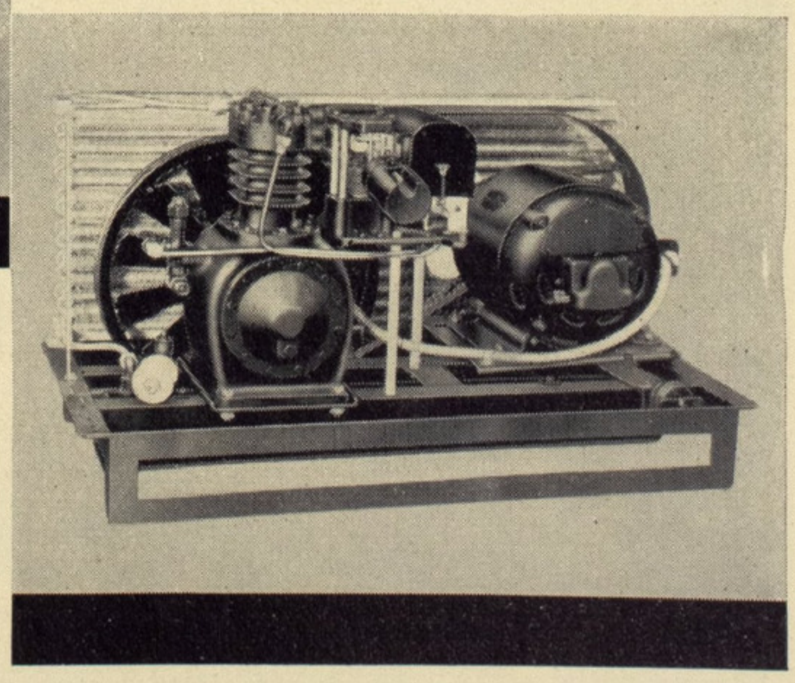
A Few of the other Prominent Users of Frigidaire for Marine Purposes

●

Standard Oil Company of Indiana
U. S. Lighthouse Bureau
(For Light Ships and Lighthouse Tenders)
United States Navy
United States Lines
Dollar Steamship Co.
Export Steamship Co.

In addition to its standard line, Frigidaire also offers equipment for ice making and for cooling drinking water.

We invite you to write for complete information. Frigidaire Corporation, Marine Division, Dayton, Ohio. (Subsidiary of General Motors Corporation).



● *Frigidaire Compressor Model A-4100. There is a complete line of coils and compressors for every requirement.*

FRIGIDAIRE

A GENERAL MOTORS VALUE

De Laval Compound Turbine and Double Reduction Gears in engine room of "CITY OF BALTIMORE"

More Speed - Better Economy

About a year ago the Baltimore Mail Steamship Company purchased five ten year old cargo vessels of 15,000 tons displacement, had the hulls lengthened and the bow and stern lines modified, according to designs by Gibbs & Cox, Inc., by the Federal Shipbuilding & Dry Dock Company, and the geared turbine and turbo-electric propelling equipments replaced with

DE LAVAL COMPOUND DOUBLE GEARED TURBINES

Results:

On her trial trip, the rebuilt "CITY OF BALTIMORE" developed an average speed of 17.77 knots, as against 11 knots before conversion and 16 knots contracted for.

The "CITY OF NEWPORT NEWS" on her trials developed an average of 18.4 knots.

"THE CITY OF HAVRE" made the run from Newport News to Havre, 3,341 nautical miles, in 8¼ days, consuming only 76.3 tons of bunker oil per day, and on the return trip she docked a day ahead of time for the emergency landing of a passenger.

"THE CITY OF HAMBURG" and the "CITY OF NORFOLK" are showing equally satisfactory performance.

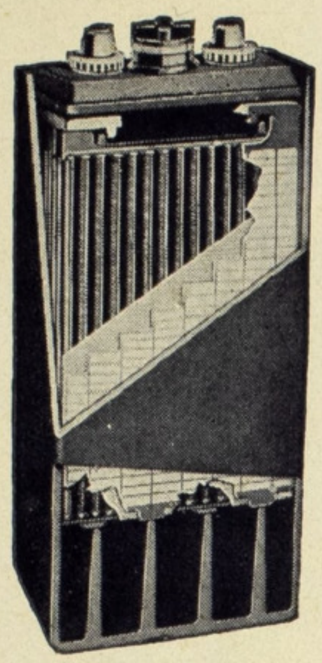
De Laval Geared Turbines give the most power from the least weight and cost.

DE LAVAL STEAM TURBINE CO., Trenton, N. J.

AD-2049

WHY

The Exide Floating Battery System is vital to the efficient operation of the modern marine power plant



SLOTTED RUBBER TUBES *of positive plates make the Exide-Ironclad Battery different from all other batteries.*

★

A MONEY-SAVING SYSTEM. *This diagram shows how the Exide-Ironclad Marine Battery is "floated" on the main bus. Write for Bulletin 3420-M, which gives a detailed description of how it works.*

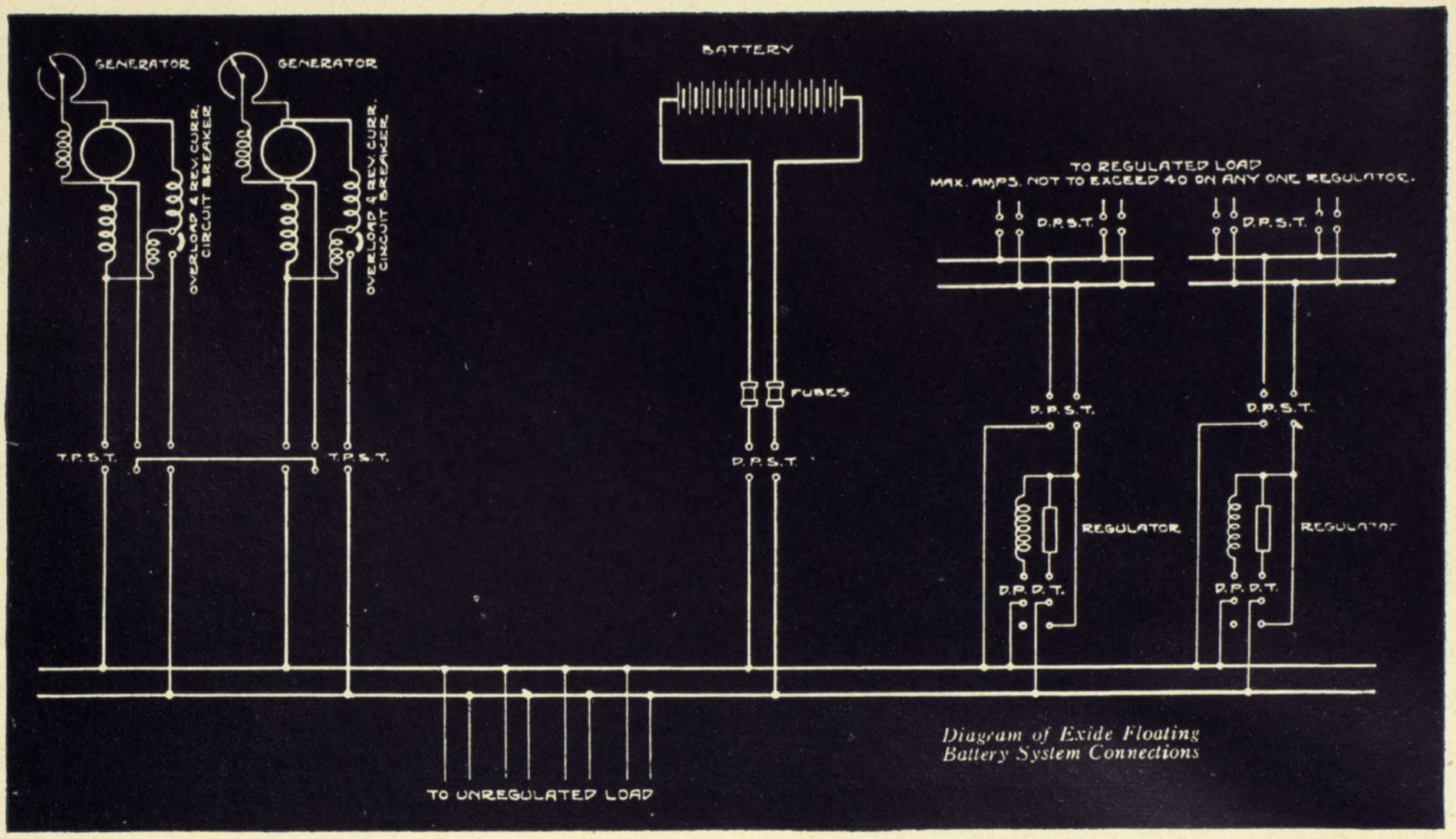


Diagram of Exide Floating Battery System Connections

THE hook-up of the Exide Marine Floating System is simple. Exide-Ironclad Battery cells are floated in series across the main bus, with suitable generator adjustment. The battery thus absorbs peak loads in excess of generator capacity. The result is smoother, more efficient and reliable operation of generator sets. The Exide Floating System also permits the use of a smaller generator unit, and often takes the place of a third emergency generator set. Saving time, labor, space and dollars.

When emergencies arise, it takes over the load *automatically* without the necessity of throwing a switch. Furthermore, when the generators resume operation, the Exide-Ironclad Battery is automatically recharged—and automatically kept in a fully charged condition.

The absolute dependability of this system is assured by the use of Exide-Ironclad Batteries. These batteries are *different* from all others; they are ideal for the heavy, rough requirements aboard ships. The positive plates of Exide-Ironclads are composed of slotted rubber tubes. These tubes permit free access of the electrolyte, yet retain the active material of the plate—just as a net retains the fish while allowing the sea to run through it.

Exide-Ironclad Marine Batteries assure absolute dependability and a long life of economical service.

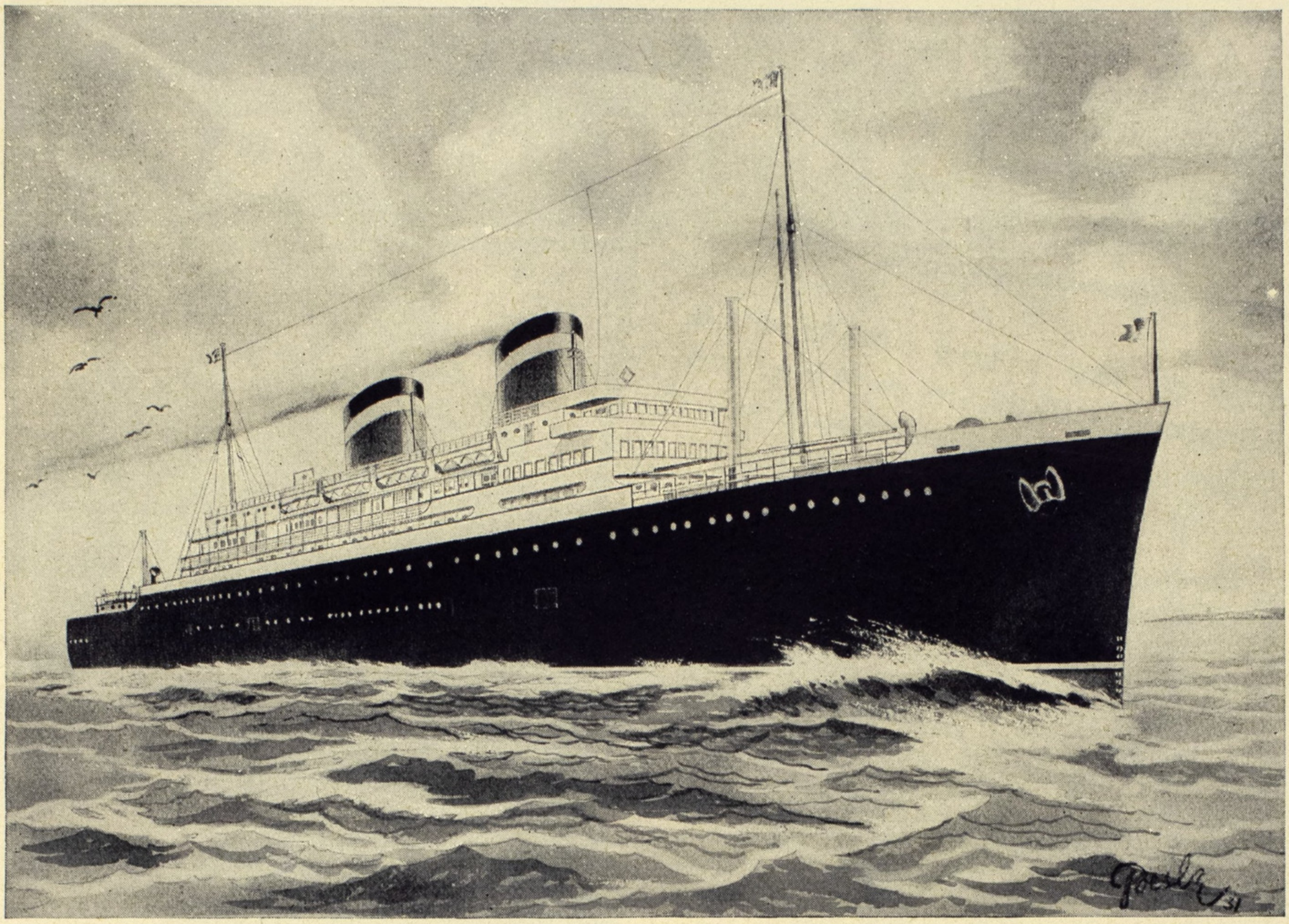
COMPACTNESS, CONVENIENCE, *and* ECONOMY *are assured when an Exide-Ironclad Marine Battery is installed aboard your boat.*

Exide
IRONCLAD MARINE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto



DISTINCTIVE SHIPS...The S.S."SANTA ROSA"

and her three sister ships now under construction at the plant of the FEDERAL SHIPBUILDING AND DRY DOCK COMPANY for the GRACE LINE PANAMA MAIL SERVICE will not only conform in every respect to the highest standards in design and construction but in addition embody features found in no other ships afloat . . . The perfect provisions planned for the comfort of the traveling public can not help but be appreciated.

US STEEL

FEDERAL SHIPBUILDING AND DRY DOCK COMPANY

GENERAL OFFICES AND WORKS: LINCOLN HIGHWAY, KEARNY, NEW JERSEY

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

FEDERAL BUILDS GOOD SHIPS

WE LIST WITH PRIDE

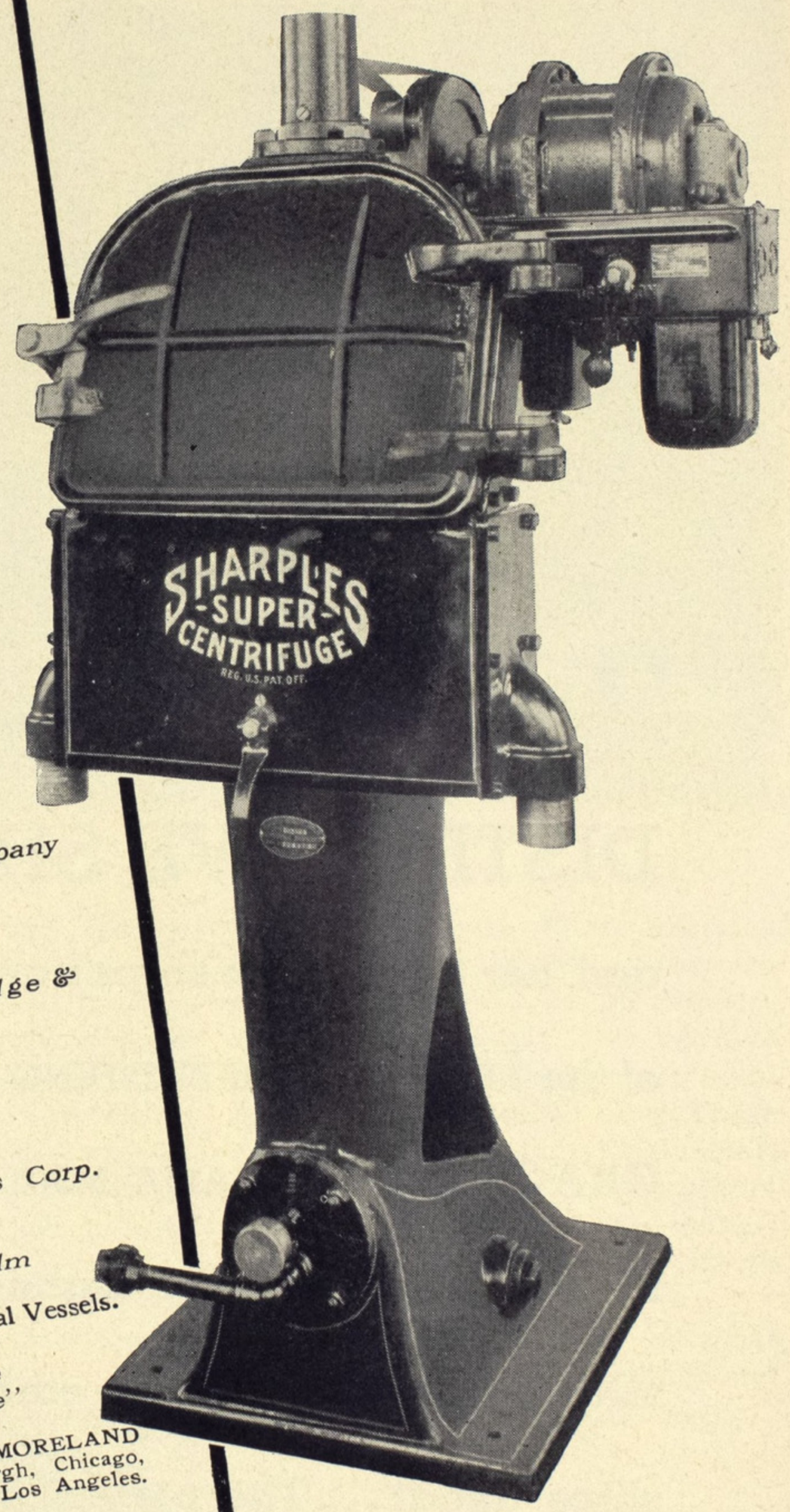
Some of the many outstanding Sharples installations on American ships commissioned, building, or contracted for in 1931

S/S "Excambion" S/S "Exeter" S/S "Excalibur" S/S "Exochorda"	*Export Steamship Company*
S/S "Mariposa" S/S "Monterey" S/S "Lurline"	*Matson-Oceanic Steamship Company*
S/S "Saint John" S/S "Acadia"	*Eastern Steamship Lines*
S/S "Unnamed as yet" S/S "Unnamed as yet"	*Colombian Steamship Company*
M/Ferry "San Diego"	*San Diego & Coronado Ferry Company*
M/Ferry "Jersey Shore"	*Delaware-New Jersey Ferry Company*
S/S "Edgewater" S/S "Chester"	*Ford Motor Company*
M/Barge "New York Socony"	*Standard-Vacuum Transportation Company*
M/S "Mercury Sun" M/S "Southern Sun" M/S "Northern Sun"	*Sun Oil Company*
S/Tug "Harry B. Williams"	*Great Lakes Dredge & Dock Company*
S/Tug "Quintus" S/Tug "Muskegon" S/Tug "Racine" S/Tug "Barlow"	*U. S. Engineers*
M/Tug "Herbert Hoover"	*Inland Waterways Corp.*
M/Tug "Mamo"	*Young Brothers*
M/Yacht "Aras"	*Mr. Hugh Chisholm*

Also several purifiers for installation on U. S. Naval Vessels.

"Ship the American way for the same efficiency that you know at home"

THE SHARPLES SPECIALTY COMPANY, 2338 WESTMORELAND ST., PHILADELPHIA. Boston, New York, Pittsburgh, Chicago, Detroit, Tulsa, New Orleans, San Francisco, Seattle, Los Angeles. Factories in England and France

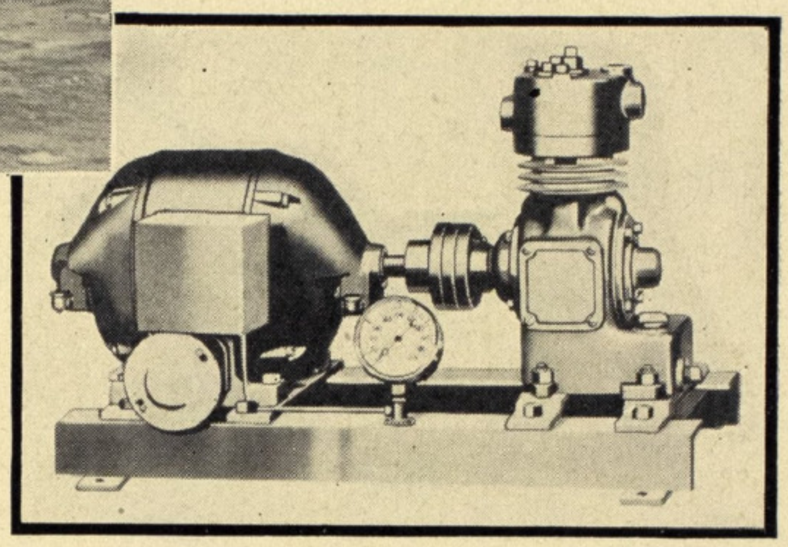


SHARPLES

CENTRIFUGAL ENGINEERS • • PHILADELPHIA

WESTINGHOUSE AIR COMPRESSORS—

This Schooner Yacht "YAWIM", built by the Burger Boat Company, has a Westinghouse 2½ cu. ft. Compressor supplying air for signal horns

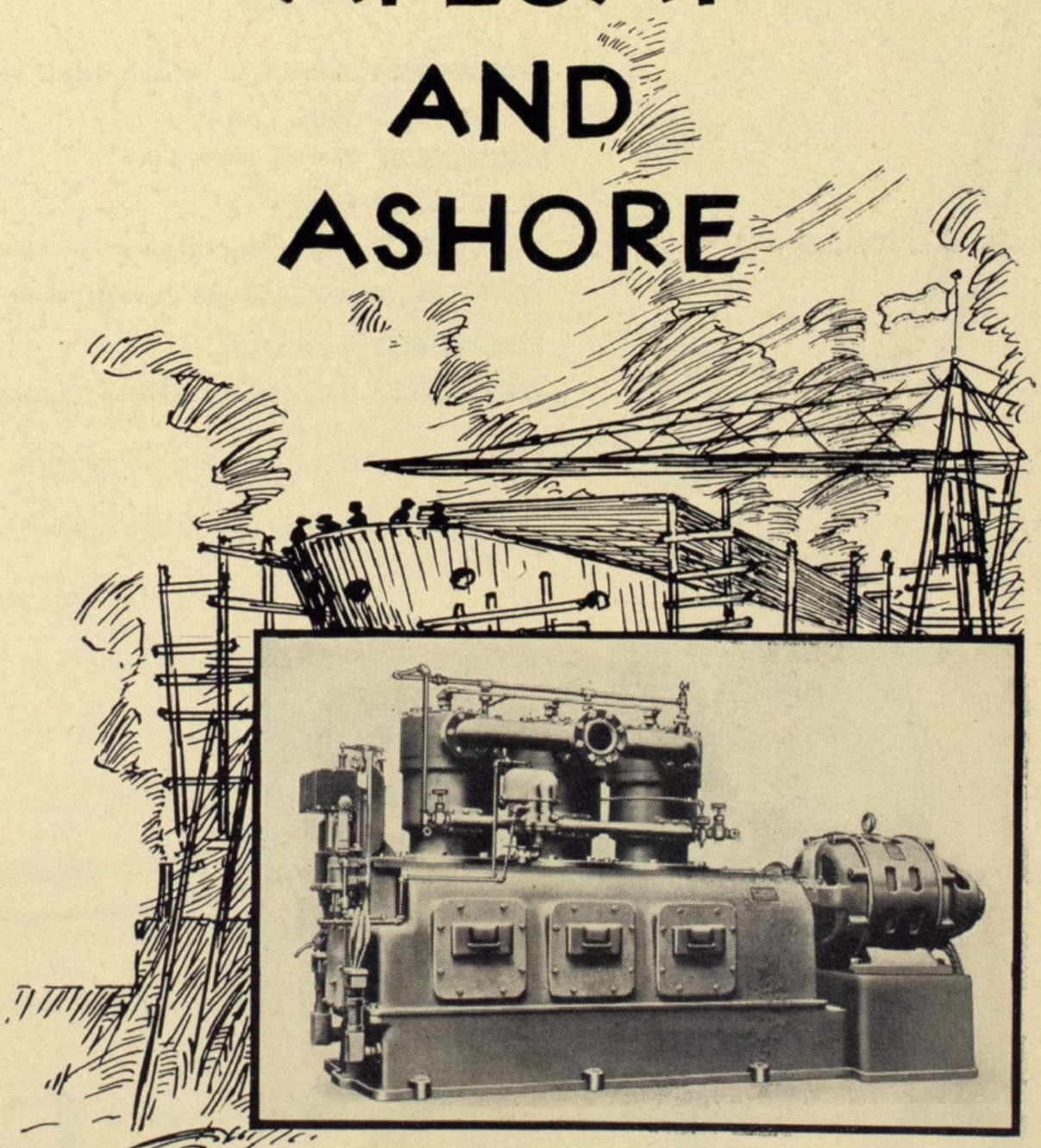


AFLOAT AND ASHORE

WHEREVER compressed air is needed in marine service—on small yachts for signal horns . . . on freighters for scaling hammers, paint sprayers, or hoists . . . on passenger liners for water raising systems, boiler tube cleaners or steering gear . . . on pile drivers for wood borers and saws . . . in light houses for fog horns . . . or in ship yards for pneumatic tools —there Westinghouse compressors are ideal because they are compact, self-contained, automatic, efficient, reliable, economical, durable . . . Many types and sizes are available, ranging from 2½ to 300 cu. ft. displacement, steam driven or motor driven. « » « » « » « » « » « »

•••

WESTINGHOUSE
TRACTION BRAKE CO.
Industrial Division
PITTSBURGH, PENNSYLVANIA



This is the Westinghouse Type 3VS Compressor, 300 cu. ft. displacement, suitable for use in ship yards, on docks, on dredges and on large vessels. « » « » « »

ELECTRIC SHIPS NOW

GENERAL

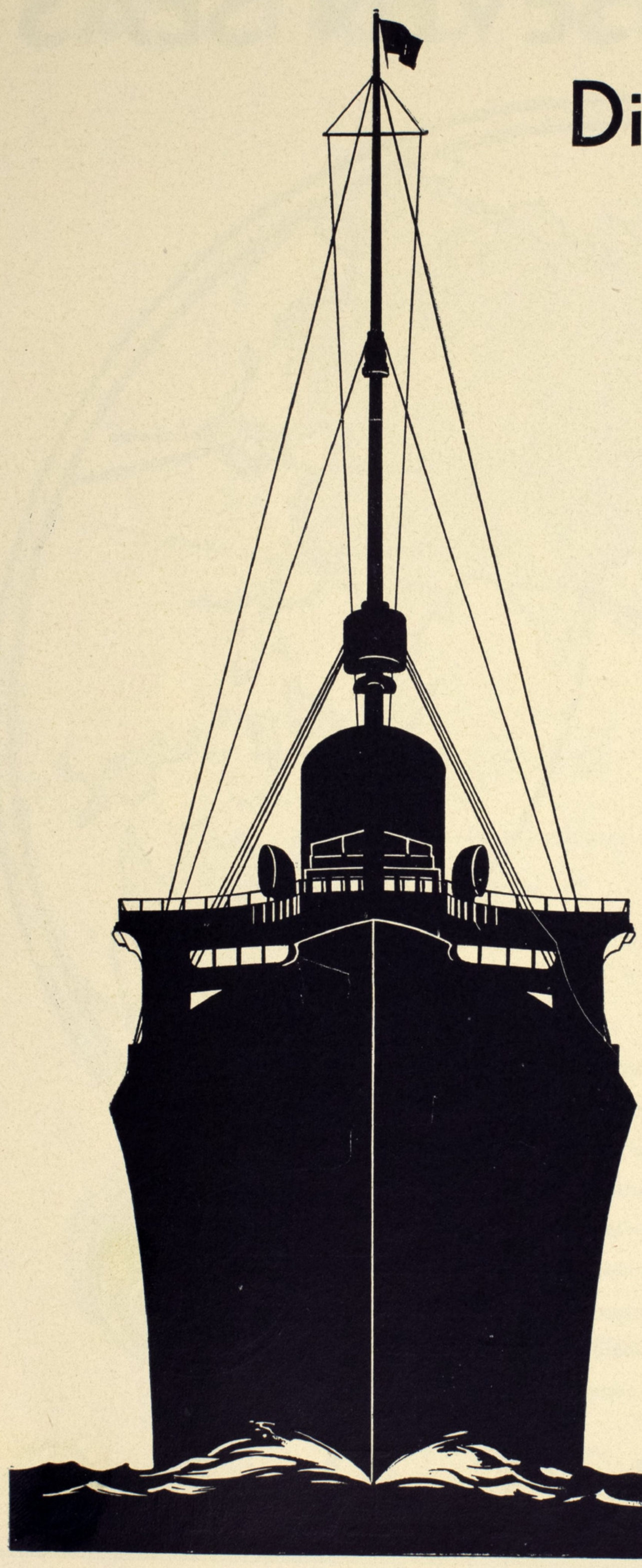
SAIL THE SEVEN SEAS

ONLY a few years ago, there were no electrically propelled commercial vessels. To-day, ships electrified by General Electric and its associated companies sail the seven seas. Their routes range the coastline of North and South America and reach round the world. The world-wide extension of G-E turbine electric drive within five years is proof of the sound principles of marine design on which General Electric's pioneer work has been based. If the last few years have brought such great development, electric drive must be considered by progressive companies in every future program of marine construction.

GE

ELECTRIC

173-25



Distinctive Ships

Ships Featured in This Issue That
Contain Babcock & Wilcox Boilers
and Auxiliary Boiler Equipment.

S. S. Florida
S. S. Lurline
S. S. Segovia
S. S. Chiriqui
S. S. Antiqua
S. S. Veragua
S. S. Quirigua
S. S. Mariposa
S. S. Monterey
S. S. Talamanca
S. S. Mark Twain
S. S. Pres. Hoover
S. S. Knickerbocker
S. S. Pres. Coolidge
U. S. C. G. C. Cayuga
S. S. Harry B. Williams

BABCOCK & WILCOX

Marine Products

Water-Tube Boilers	Economizers
Pulverized-Coal Equipment	Stokers
Water-Cooled Furnaces	Air Heaters
Feedwater Regulators	Refractories
De-Superheaters	Superheaters
Oil Separators	Oil Burners

and Distinctive Modern Steam Equipment

S. S. Vesta
S. S. Exeter
S. S. Arcadia
S. S. Saint John
S. S. Borinquen
U. S. S. Ranger
S. S. Santa Rosa
S. S. Santa Luisa
S. S. Exochorda
U. S. L. T. Lilac
U. S. S. Astoria
S. S. Excambion
S. S. Murray Hill
U. S. S. Tuscaloosa
U. S. S. Indianapolis
U. S. S. Minneapolis
U. S. S. New Orleans
U. S. S. San Francisco
U. S. C. G. C. No. 55
S.S. Harry F. Sinclair, Jr.
S. S. Matthew J. Boyle
S.S. Washington Square
S.S. Henry A. Laughlin
S. S. Manhattan & Sister Ship

THE justified faith of the Marine Industry in Babcock & Wilcox Boiler Equipment is expressed by the installation of B & W Boilers and Auxiliary Boiler Equipment in many of the Distinctive Ships featured in this issue of "Marine Review". A survey of the entire list of ships built or contracted for in 1931 proves that where efficiency, economy and reliability are of importance, Babcock & Wilcox Equipment has been specified.

With over forty years of experience in the highly specialized engineering required for the solution of marine propulsion problems, The Babcock & Wilcox Company is not only well able to meet every requirement in boiler equipment, but to fully develop the true possibilities of Modern Steam. *And Modern Steam is recognized as the one propulsion system holding the greatest opportunities for further savings.*

The number of ships selected by the Editors of Marine Review for description in this issue is necessarily limited. The ships listed above were also built or contracted for during 1931 and contain Babcock & Wilcox Boilers and Auxiliary Boiler Equipment.

THE
BABCOCK & WILCOX
COMPANY

CLEVELAND NEW YORK SAN FRANCISCO

M-16-T

ON REVIEW

the Worthington equipped vessels

FOR 1931

VESSEL	BUILDER	OWNER
Caroline	Bath Iron Works Corp.	E. R. Johnson
Mariposa	Bethlehem Shipbuilding Corp., Ltd.	Matson Navigation Co.
Monterey	Bethlehem Shipbuilding Corp., Ltd.	Matson Navigation Co.
Lurline	Bethlehem Shipbuilding Corp., Ltd.	Matson Navigation Co.
New York Socony	Bethlehem Shipbuilding Corp., Ltd.	Vacuum Socony Trans. Co.
Tug YT—119	Boston Navy Yard	United States Navy
New Orleans	Brooklyn Navy Yard	United States Navy
Fishhawk	Charleston Dry Dock & Machine Co.	Capt. P. A. Petterson
Herbert Hoover	Dubuque Boat & Boiler Co.	Inland Waterways Corp.
Todd	Dubuque Boat & Boiler Co.	United States Engineers
Dredge	Dravo Contracting Co.	United States Engineers
Dredge	Ellicott Machine Corp.	United States Engineers
City of Baltimore	Federal Shipbuilding & Dry Dock Co.	Baltimore Mail Steamship Line
City of Norfolk	Federal Shipbuilding & Dry Dock Co.	Baltimore Mail Steamship Line
City of Newport News	Federal Shipbuilding & Dry Dock Co.	Baltimore Mail Steamship Line
City of La Havre	Federal Shipbuilding & Dry Dock Co.	Baltimore Mail Steamship Line
City of Hamburg	Federal Shipbuilding & Dry Dock Co.	Baltimore Mail Steamship Line
Santa Rosa	Federal Shipbuilding & Dry Dock Co.	Panama Mail Line
Santa Paula	Federal Shipbuilding & Dry Dock Co.	Panama Mail Line
Santa Lucia	Federal Shipbuilding & Dry Dock Co.	Grace Steamship Co.
Santa Elena	Federal Shipbuilding & Dry Dock Co.	Grace Steamship Co.
Chester	Great Lakes Engineering Works	Ford Motor Co.
Edgewater	Great Lakes Engineering Works	Ford Motor Co.
Mark Twain	Howard Shipyards & Dock Co.	Inland Waterways Corp.
San Francisco	Mare Island Navy Yard	United States Navy
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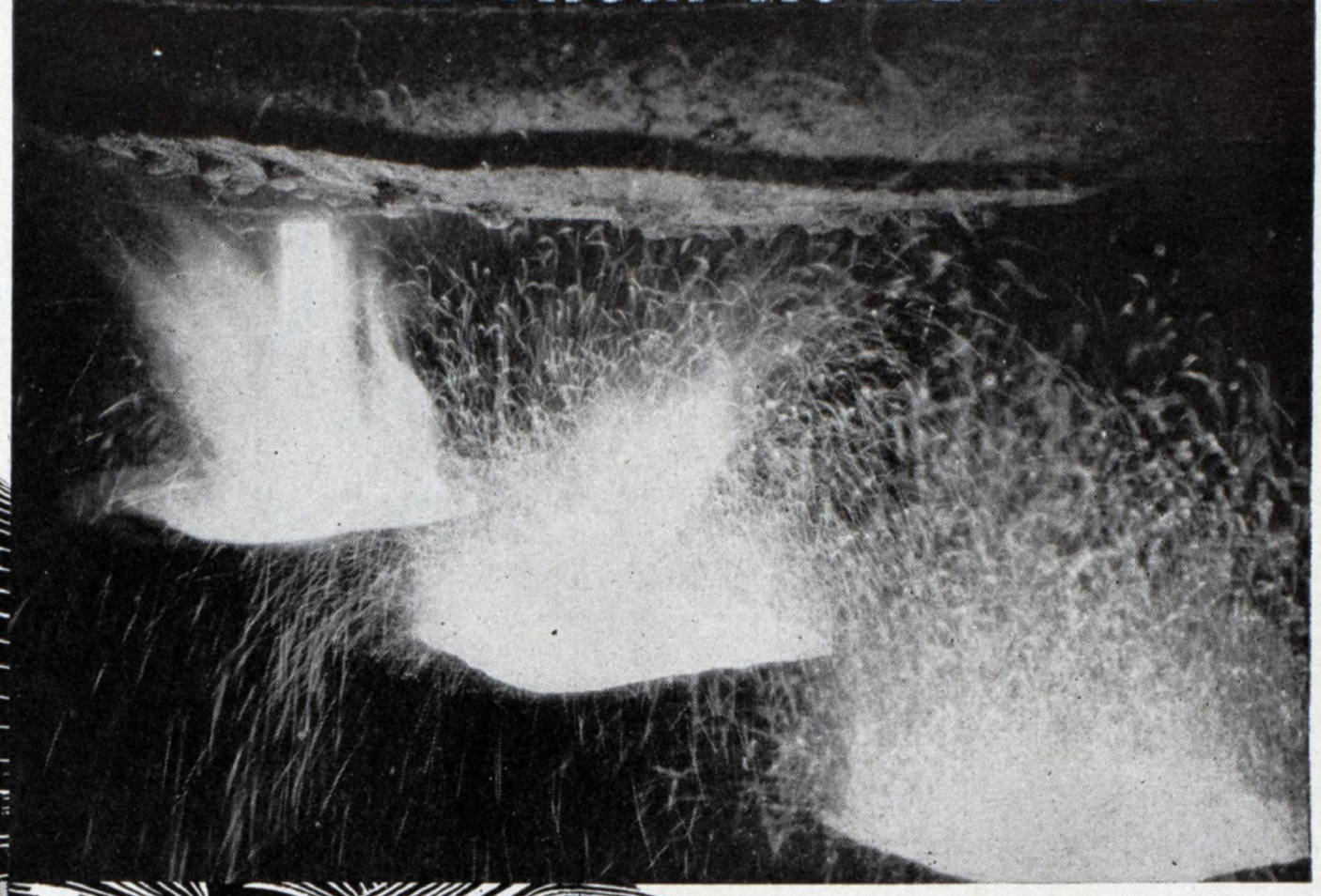

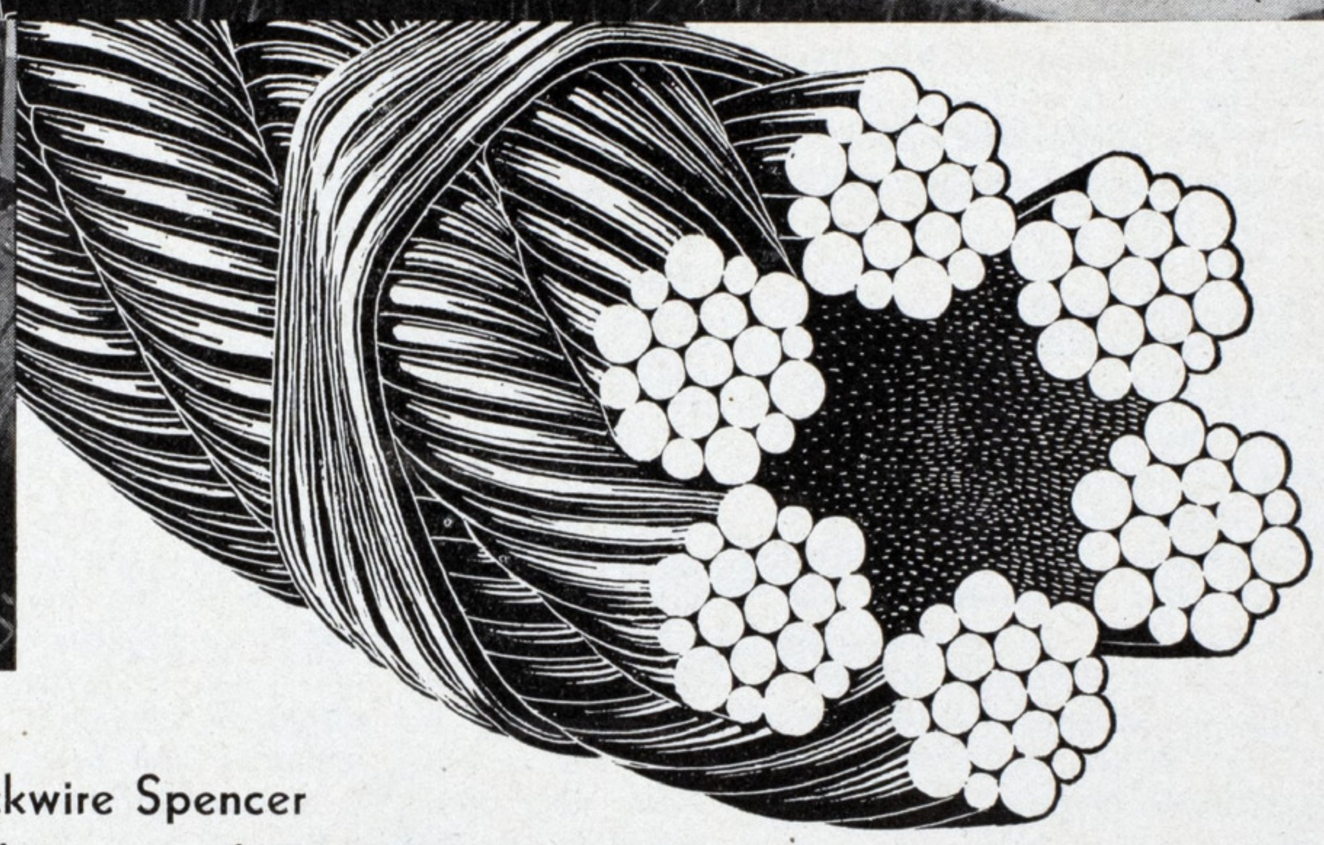

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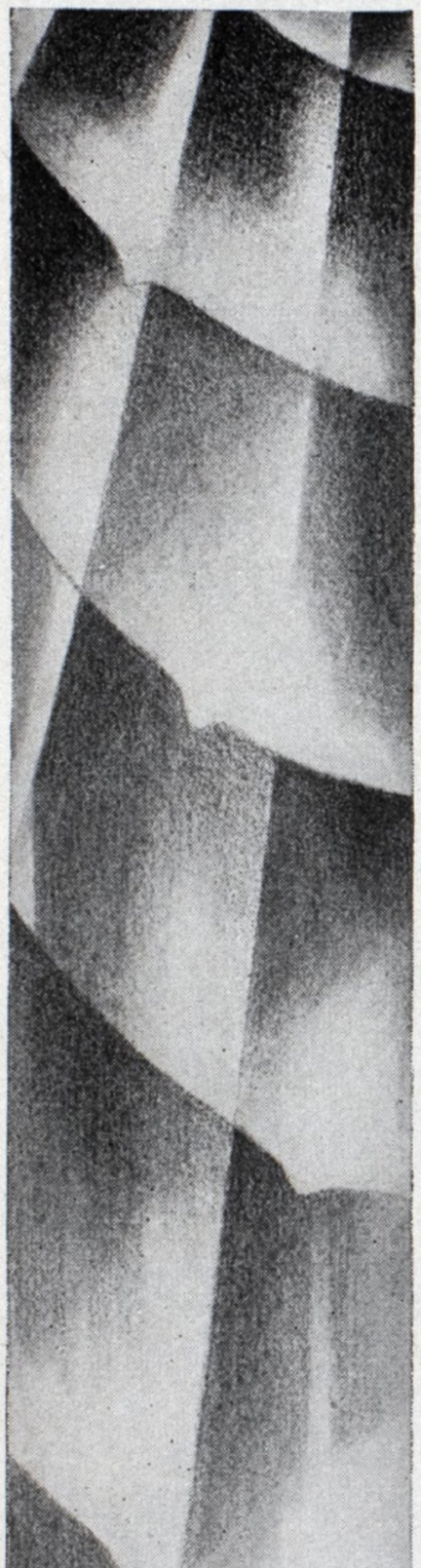

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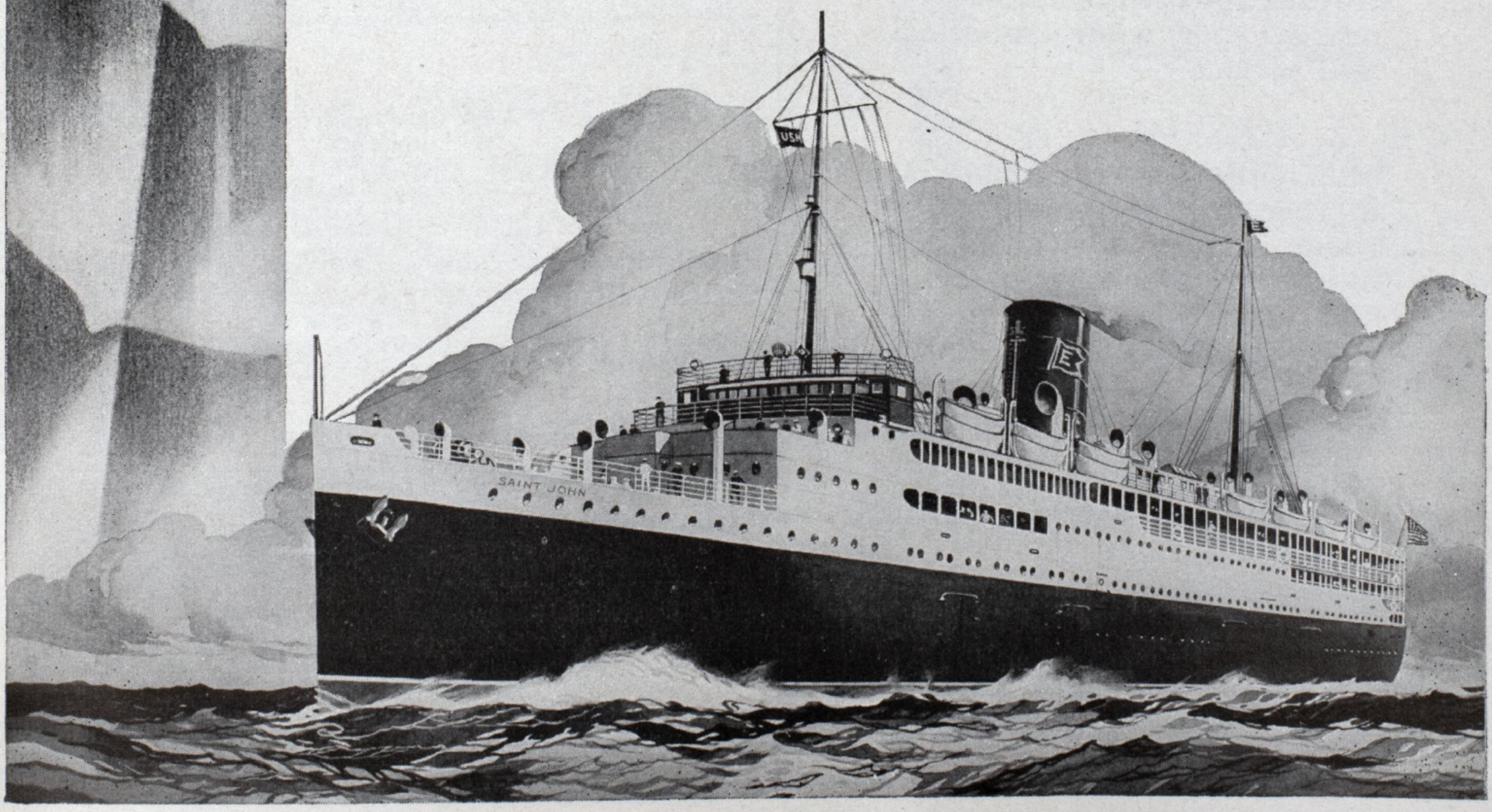

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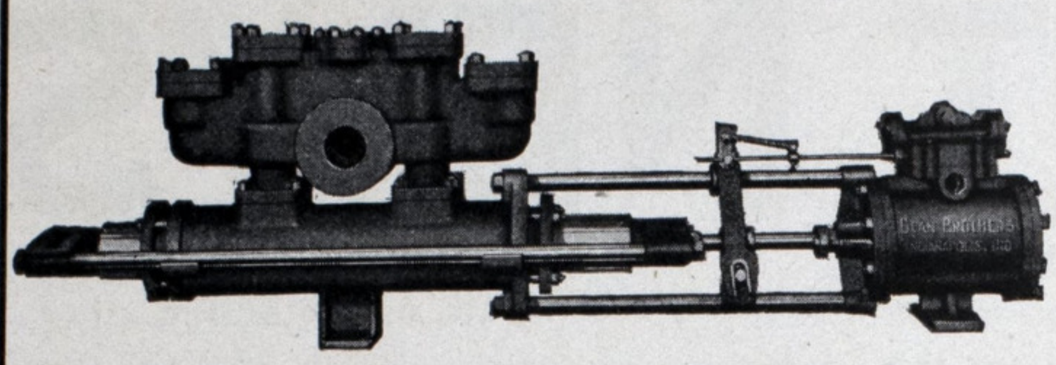

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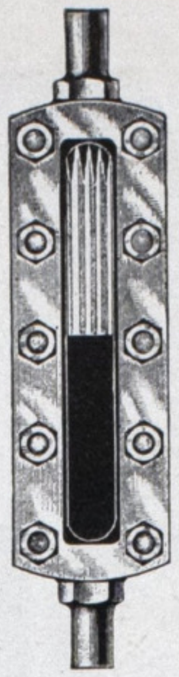

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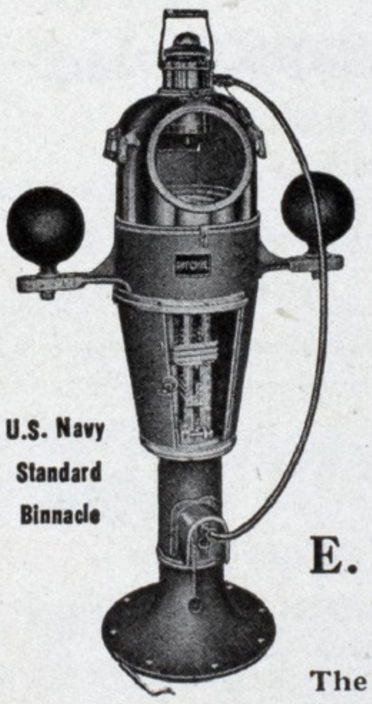

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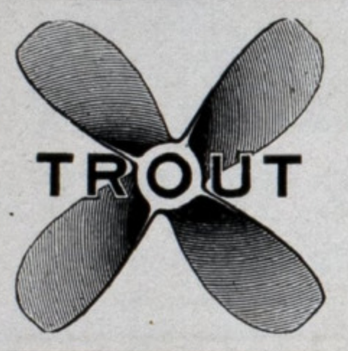

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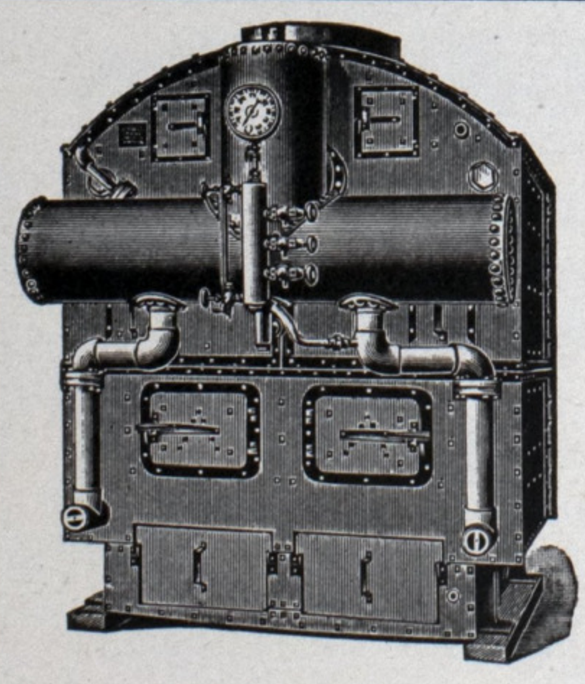

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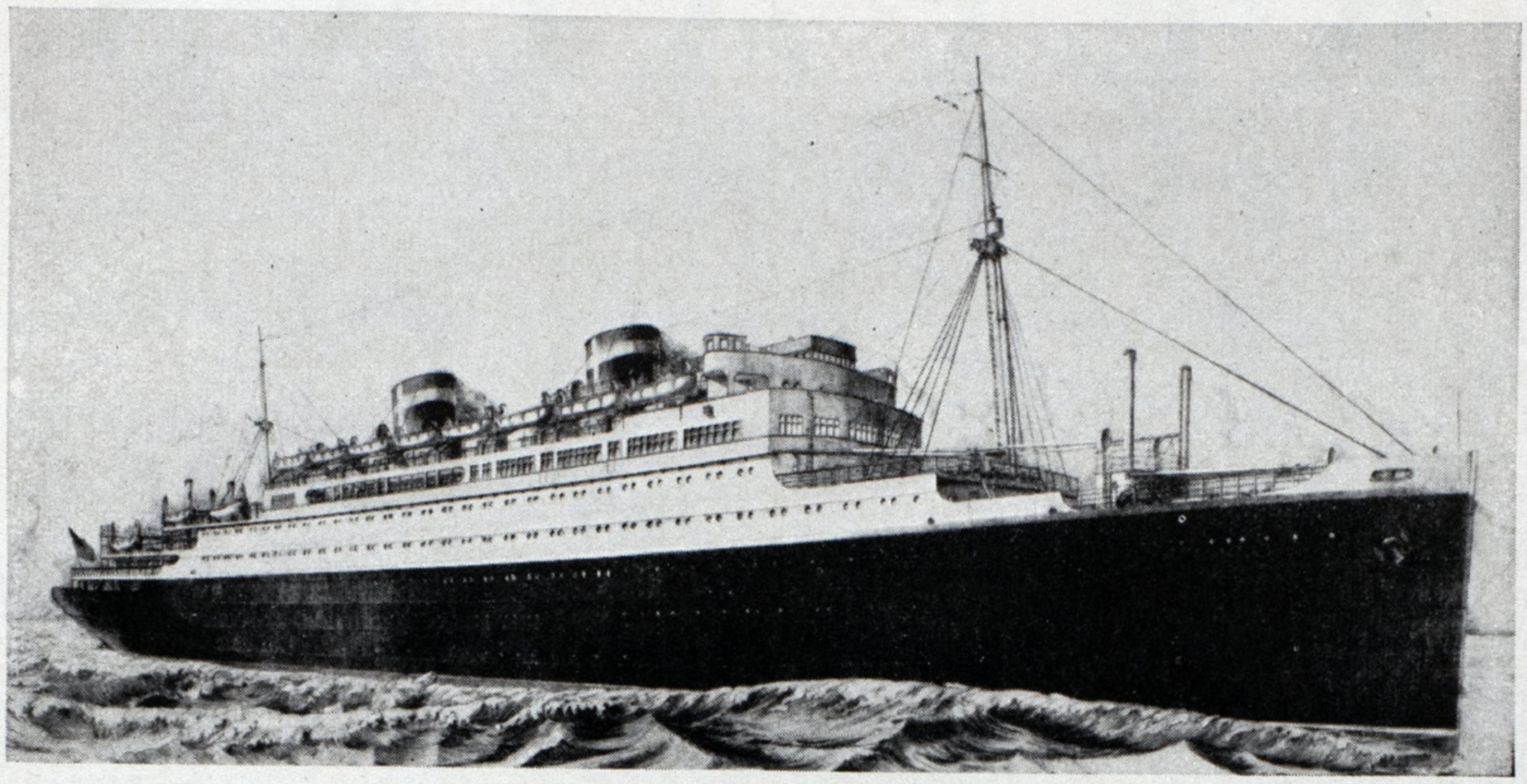

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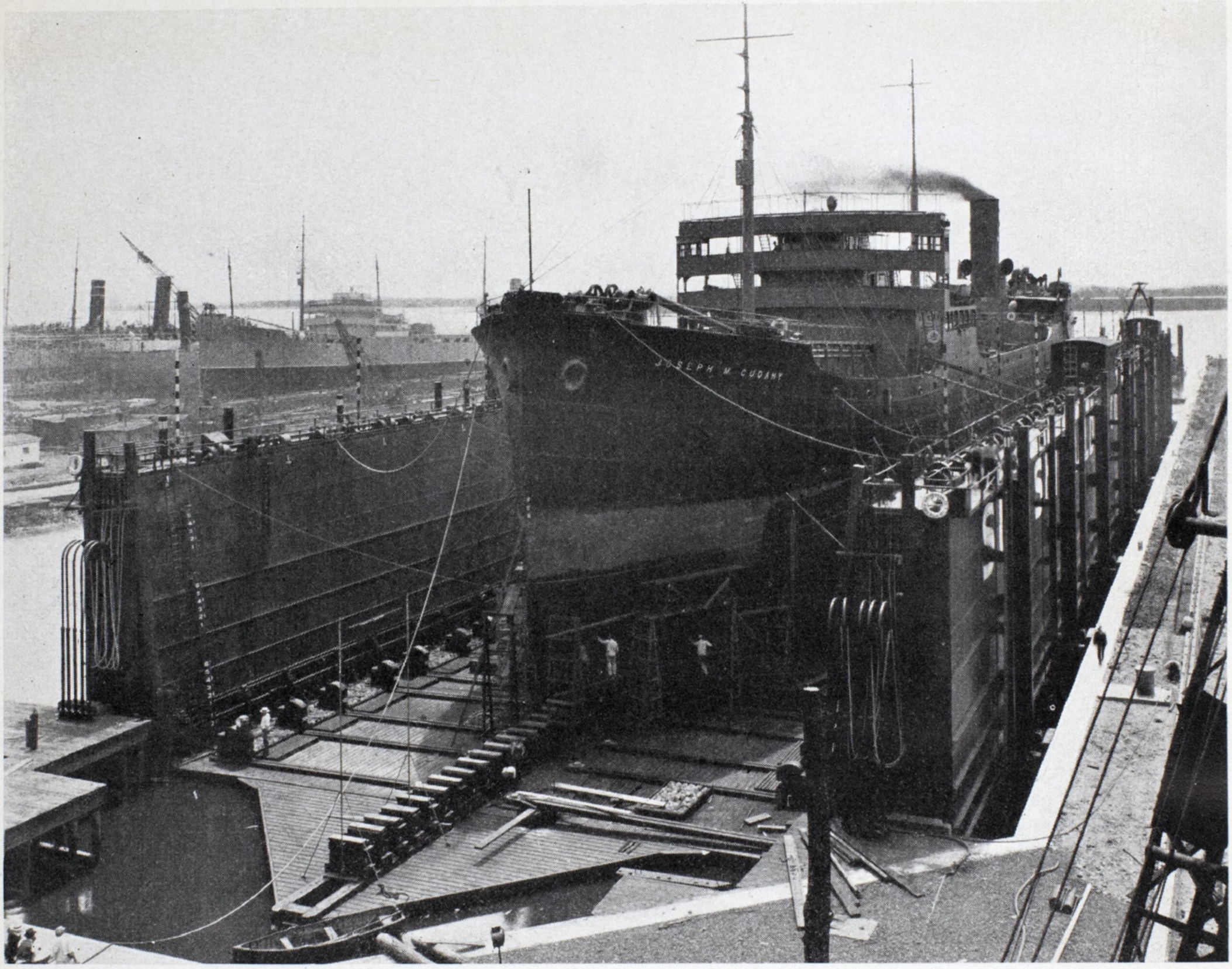

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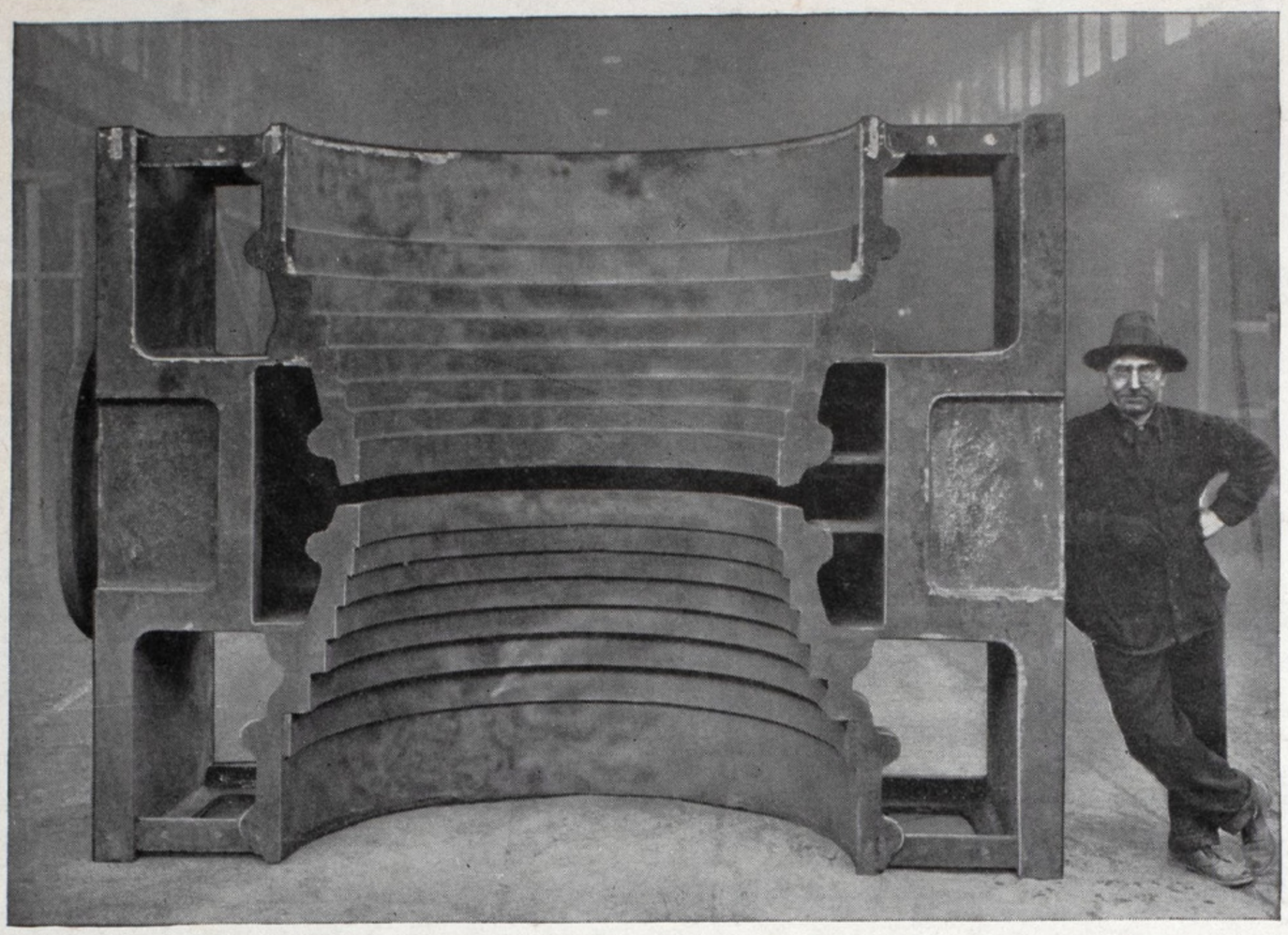

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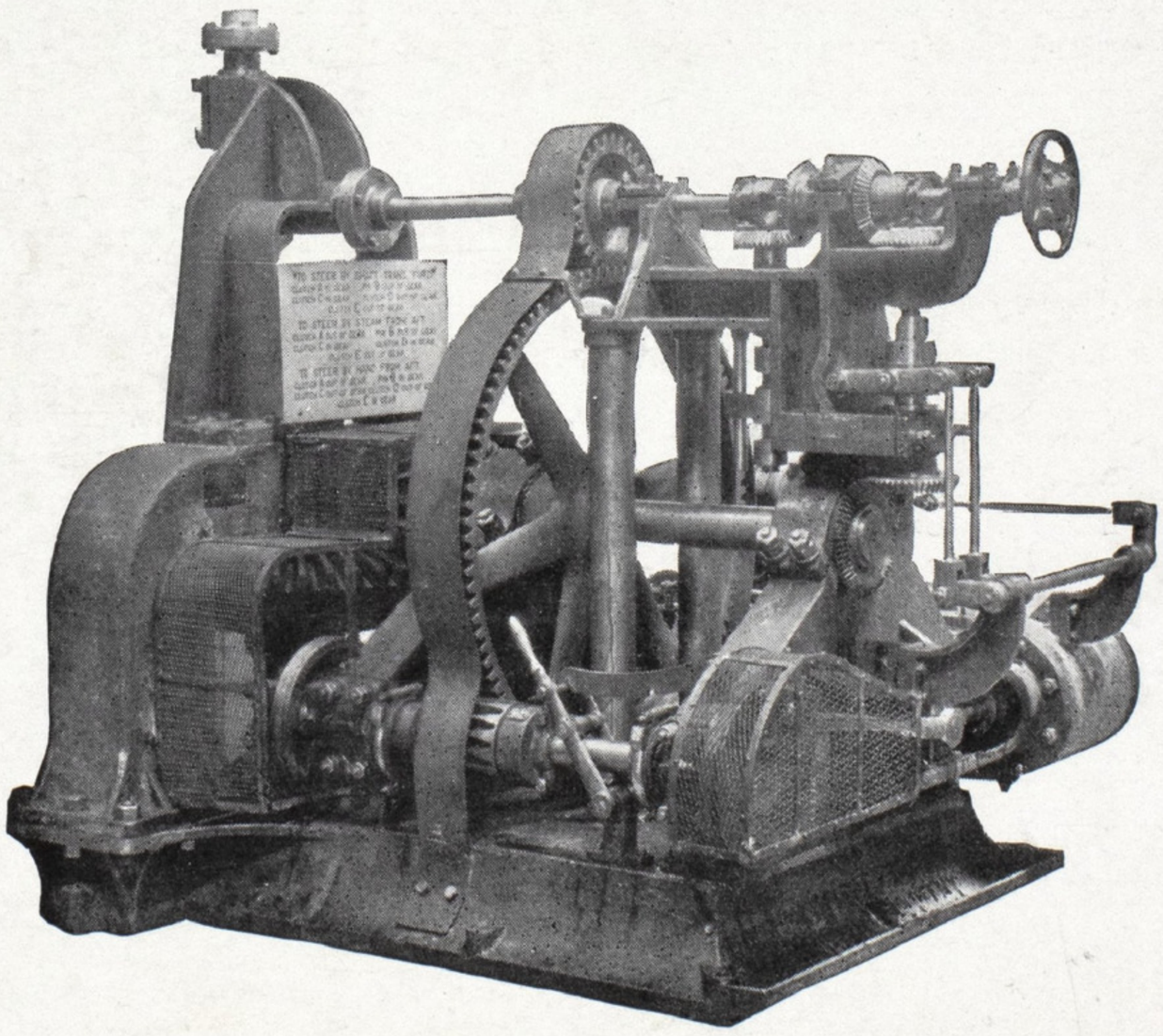

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